

Editorial and Advertising Offices  
100 East 42nd St., New York 17, N.Y., U.S.A.

**J. H. VAN DEVENTER**  
President and Editorial Director

**C. S. BAUR**  
Vice-President & General Manager

**H. E. LEONARD**  
Assistant General Manager

**B. H. HAYES**  
Advertising Manager

**O. L. JOHNSON**, Manager  
Reader Service and Market Research

**R. E. BAUR**, Production Manager  
**R. E. CLEARY**, Technical Research and  
Promotion Manager

Regional Business Managers

<b>C. H. OBER</b> New York 17 100 East 42nd St.	<b>H. E. LEONARD</b> New York 17 100 East 42nd St.
<b>ROBERT F. BLAIR</b> Cleveland 14 1016 Guardian Bldg.	<b>R. M. GIBBS</b> Pittsburgh 22 428 Park Bldg.
<b>B. L. HERMAN</b> Philadelphia 39 Chilton Bldg.	<b>H. K. HOTTENSTEIN</b> Chicago 3 1134 Otis Bldg.
<b>PERCE LEWIS</b> Detroit 2 7910 Woodward Ave.	<b>D. C. WARREN</b> Hartford 1, Conn. P. O. Box 81
<b>R. RAYMOND KAY</b> Los Angeles 28 2420 Chermoya Ave.	

Owned and Published by  
**CHILTON COMPANY**  
(Incorporated)

Executive Offices  
Chestnut and 54th Sts.  
Philadelphia 39, Pa., U.S.A.

OFFICERS AND DIRECTORS  
**C. A. MUSSELMAN**, President

<b>JOS. S. HILDRETH</b>	Vice-President
<b>GEORGE H. GRIFFITHS</b>	Vice-President
<b>EVERIT B. TERHUNE</b>	Vice-President
<b>J. H. VAN DEVENTER</b>	Vice-President
<b>C. S. BAUR</b>	Vice-President
<b>P. M. FAHRENDORF</b>	Vice-President
<b>WILLIAM A. BARBER</b> , Treasurer	
<b>JOHN BLAIR MOFFETT</b> , Secretary	
<b>JULIAN CHASE</b>	<b>HARRY V. DUFFY</b>
<b>G. C. BUZZY</b>	<b>THOMAS L. KANE</b>
<b>CHARLES J. HEALE</b>	

**WILLIAM H. VALLAR**, Asst. Treas.

Member Audit Bureau of Circulation



Member, Associated Business Papers



Indexed in the Industrial Arts Index. Pub-  
lished every Thursday. Subscription Price  
North America, South America and U. S.  
Possessions, \$8; Foreign, \$15 a year.  
Single Copy, 35 cents.

Cable Address, "Ironage" N. Y.

Copyright 1945, by Chilton Company (Inc.)

# This Week in The IRON AGE

Vol. 155, No. 19

May 10, 1945

## Editorial

Ants Don't Sing ..... 63

## Technical Articles

Super High Speed Cutting of Metals .....	66
Deep Drawing Magnesium Alloy Sheets .....	70
High Reproducibility in Precision Casting .....	75
Forge Furnaces on Springs Isolate Shock .....	77
Controlled Spheroidization of Pearlitic Malleable Iron .....	78
Production Shorts at Ryan Aeronautical Co. ....	82
Producing Template Negatives on the Draftsman's Table .....	84
New Equipment .....	86

## Features

News Front .....	65
Assembly Line .....	90
Washington .....	94
West Coast .....	98
Personals and Obituaries .....	102
Dear Editor .....	106
This Industrial Week .....	108
News of Industry .....	111

## News and Markets

Additional Warehouse Officers Elected .....	122
Quarter's Output Tops Billion .....	124
Steel Co. of Canada Progress .....	126
Construction Machinery Committee Formed .....	130
Canadian Production Limitations Clarified .....	132
Henderson Returns From China .....	141
Machine Tool Market Developments .....	144
Nonferrous Metals News and Prices .....	146-147
Iron and Steel Scrap News and Prices .....	148-149
Comparisons of Prices by Week and Year .....	150
Finished Iron and Steel .....	152-153
Warehouse, Semi-Finished, NE Steel Prices .....	154-156
Steel Pipe, Tubing, Wire Products, Prices .....	158-159
Pig Iron and Coke Prices .....	160-161
Stainless Steel and Ferroalloy Prices .....	162

Index to Advertisers ..... 228

# TREAT 'EM RIGHT



## Keep Your Carbide Tools in the Fight

CONSERVE THE TOOLS YOU HAVE!

If you follow a few simple rules now, you can avoid a critical tool situation in your plant. Handle all your present carbide tools with "kid gloves"—treat 'em right—and they will give better service, do all that is asked of them, and enable you to meet your greatly increased production schedules.

For practical information on how best to conserve your carbide tools and save delays, get in touch with Firth-Sterling.

**Firth-Sterling**

STEEL COMPANY

**FIRTHITE**

### 3 RULES

#### THAT CONSERVE TOOLS

##### HANDLE 'EM WITH CARE

Carelessness may damage cutting edges.



**KEEP 'EM SHARP**  
Re-sharpen in time!  
A dull edge slows production.

##### GRIND 'EM PROPERLY

Find out the right way—and do it.



OFFICES: NEW YORK • PHILADELPHIA • PITTSBURGH • CLEVELAND • DAYTON • DETROIT • CHICAGO • LOS ANGELES



# The IRON AGE

ESTABLISHED 1885

May 10, 1945

J. H. VAN DEVENTER

President and Editorial Director

C. S. BAUR

Vice-President and General Manager

## Editorial Staff

Editor.....T. W. LIPPETT

Technical Editor.....F. J. OLIVER

Commercial Editor.....T. C. CAMPBELL

## Associate Editors

F. J. WINTERS

JACK R. HIGHT

J. ALBIN

JOHN ANTHONY

S. H. BARMASEL

## Editorial Assistants

M. M. SCHIEN

H. W. VAN CAMP

C. R. MUNZER

J. P. O'CONNOR

E. O. MILLER

J. HANSEN

S. P. DAVIS

## Regional News and Technical Editors

T. E. LLOYD

Pittsburgh 22

428 Park Bldg.

C. T. POST

Chicago 3

1134 Otis Bldg.

L. W. MOFFETT

DONALD BROWNE

EUGENE HARDY

Washington 4

National Press Bldg.

W. A. LLOYD

Cleveland 14

1016 Guardian Bldg.

S. H. BRAMS

Detroit 2

7310 Woodward Ave.

OSGOOD MURDOCK

San Francisco 3

1355 Market St.

## Editorial Correspondents

ROBERT MCINTOSH

Cincinnati

L. C. DEAN

Buffalo

G. FRAZER

Boston

HUGH SHARP

Milwaukee

F. SANDERSON

Toronto, Ont.

R. RAYMOND KAY

Los Angeles

JOHN C. McCUNE

Birmingham

ROY EDMONDS

St. Louis

JAMES DOUGLAS

Seattle

## Ants Don't Sing

IN these days of man and woman-power shortages one is fortunate to be able to get into a hospital and of course doubly so to be able to get out of it again. So I am putting 1945 down as my lucky year. Twice in a hospital and twice out: First, two months ago with pneumonia and again, a week ago after a car collision with a ten-ton truck, with nothing more serious to show for it than a broken wrist and a couple of cracked ribs.

So this has been written in the country among the birds, the bees, and the broadcasts from San Francisco and with plenty of time to think about these and other things.

The San Francisco happenings have made me think about the apparent disadvantages of democracy and the superior efficiency of regimentation when it comes to getting things done neatly and quickly. There are differences of opinions and of interests at this World Security Conference and it is going to take some time and some doing to reconcile them.

How much simpler it would be if the delegates would just hold an election and choose one man to be World Boss or Supreme Dictator then they could all adjourn and go home and leave it to him to issue the order.

Instead of choosing this simple and easy way, however, these representatives from all over the world have taken the hard road to cooperation as contrasted to dictation. Evidently they believe that while this will require a good deal of giving-in and giving-up by all hands, the hard road may make easier traveling for the generations that will come after them.

After all, efficiency in world relations as well as in industry and business must be measured over the long term and not the short term. It may be that you can get something done more quickly by ordering it to be done, if you are in position to order, than by taking the time and effort to convince those who are to do it that it should be done. But action without conviction is not likely to be as lasting or whole-hearted as is that based upon belief in rightness of objective and method.

Alfred P. Sloan, Jr. who certainly has demonstrated the ability to get things done, once said that he would rather spend hours to convince an executive as to the rightness of a proposed policy or action than to save time by issuing an "unsold" order. That seems to me to be sound doctrine not only for World Security delegates and industrialists but all the way down to papa and mama in family affairs.

In nature, the birds have, I think, done better than the ants in working out cooperation under democracy. They agree to act as a group when necessary as in periods of migration but in the interims the individuals are as free as the air.

The ants probably accomplish more than the birds when it comes to work. They march in regiments and build communal homes in which they sleep after twelve or fourteen-hour days of labor. But ants don't sing and birds do.

*J. H. Baur*

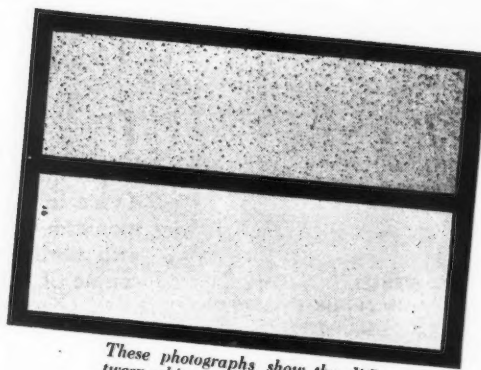
# WHAT INLAND TI-NAMEL WILL DO FOR YOU



Hunter Nead (right) manager, and Frank Porter, ceramic engineer, both of Inland's Metallurgical and Inspection Department, check the fine quality of a single coat of enamel on a Ti-Namel panel.



This deep drawn part, 8 inches in diameter by 7 1/2 inches deep, was made from 18-gage Ti-Namel Steel and then given one coat of white enamel.



These photographs show the difference between white finish coat applied directly to the base metal and fired on ordinary enameling stock (above) and Inland Ti-Namel (below).

Do you manufacture or buy porcelain enameled products? Then you should know about the remarkable advantages of the new enameling alloy steel—Ti-Namel—the most recent development of Inland research.

**IF YOU ARE A MANUFACTURER.** Inland Ti-Namel Steel eliminates the necessity for a ground coat on porcelain enameled products. White or color cover coat vitreous enamels are applied direct to the base metal. Ti-Namel does not age strain. It can be easily deep drawn. It reduces shop reoperations, edging, and scrap. It does not reboil. It is fired at lower temperatures, and in shorter time. Inland Ti-Namel Steel increases shop output, lowers manufacturing costs, and assures better enameled products.

**IF YOU ARE A BUYER OF PORCELAIN ENAMELED WARE.** When you specify Inland Ti-Namel Steel you will get enameled products that are unsurpassed, the finish being equal to the best multi-coat ware. The thin finish coat or coats applied direct to the base metal, will have high reflectance, reduced damage hazard, and longer service life. Write today for your copy of the new Ti-Namel Bulletin!

Pending patent applications on the new enameling process and product made thereby are owned jointly by Inland Steel Company and The Titanium Alloy Manufacturing Company under trust agreement.

Inland Steel Company, 38 S. Dearborn Street, Chicago 3, Ill.  
**Sales Offices:** Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

**Principal Products:** Bars, Floor Plate, Piling, Plates, Rails, Reinforcing Bars, Sheets, Strip, Structurals, Tin Plate, Track Accessories.

## INLAND TI-NAMEL

# NEWS FRONT

► Appointment of Dr. J. R. Mahoney, of the University of Utah, to assist the Surplus Property Board in the disposal of government owned steel plants is regarded as a straw in the wind indicating that U. S. Steel will wind up owning the Geneva, Utah, plant.

Samuel Moment, appointed at the same time to advise on aluminum plant disposal is reported to be in favor of increased competition in the light metals field.

► Suffering a second quarter relapse, steel production in France has dropped to about 10 per cent of capacity, following a much stronger start earlier in the year. Estimates are that coal production continues at about 30 per cent of capacity.

► Conflicts are foreseen in the planning of WMC, OPA, and WPB for the days following VE-Day. WMC's policy of refusing to issue certificates of availability in certain areas is said to have put men on relief rolls already.

► Fighter plane design thinking, already 100 per cent converted to gas turbine propulsion, is now accepting the viewpoint that radio control will replace the pilot in this field. Tests in this country prove the complete controllability of such missiles, with an entirely different type of system than anything used by the Germans.

Plans now being made call for conversion of bombers, as well as fighters, to gas turbine propulsion. Such applications will probably be geared turbine-propeller-jet combinations rather than the pure jet systems now in use on fighters.

► An Indian Purchasing Mission, long awaited in this country by export-minded businesses, and headed by J. R. Tata and G. D. Birla has been delayed by Mr. Tata's illness. The group is now in London and it appears that late May or early June will approximate their arrival in the United States.

Coming as a private group interested in the overall industrialization of India, the combine represented is stated to have unprecedented sums of Indian money ready to invest in American equipment, to be bought as complete plants. Their plan is for control to remain in the hands of native Indians.

► WPB has been soliciting civilian manufacturers, fabricators and particularly smaller plants to place orders and indicate requirements for conversion tools and materials for civilian production.

It is apparent that the all-inclusive CMP system will dwindle, leaving only highly rated MM (must military) orders and CC (compulsory civilian) requirements. Any mill or essential producer will fill these first and be free to do what he wishes with the remainder of his production.

► Machine tool orders are reflecting the fact that railroad shops have embarked on long overdue rehabilitation work. Farm implement manufacturers indicate that they are considering sizeable retooling for new models.

► The heavy shell program embracing 240 mm. and 8 in. shells is being cut back 50 per cent as of this week. A May 11 meeting on the 105, 90, 81, and 75 mm. artillery shell and the 60 mm. mortar programs is scheduled to effect 50 per cent cut back on those lines.

► The tungsten carbide shell core program will involve a total of 40 to 60 millions in plant and equipment expansion, and will use a total of 6 to 9 times the total 1940 output of tungsten.

Of the expansion program, the Carboloy Co. will build at least two \$6,000,000 plants.

► Fragmentation bomb programs are also being heavily cutback, but no easement of pressure on high explosive bombs and rockets is foreseen in the near future.

► The new wage scale plan adopted by the Reynolds Metals Co. plants in Louisville, Ky., will permit workers to achieve top rate of pay after only 11 months. Previously, maximum rates were attained after some 20-odd months of service.

Starting rates being at 62 to 85c. an hr. depending on job classification and go up to \$1.05 an hr.



# Super High Speed Cutting of Metals

By PROF. V. D. KUZNETSOV  
Siberian Physico-Technical Institute,  
U. S. S. R.

**... Theoretical considerations confirmed by experimental results indicate that the energy consumed in cutting is primarily made up of work done in plastic and elastic deformation. With increasing speed a metal tends to behave more and more as a brittle material, with plastic deformation and hence energy consumption becoming less and less. Turning tests on steel at 4900 ft. per min. showed little heat was generated. Cast iron and aluminum behaved like brittle materials when milled at high speeds, while carbon steel and copper did not. The original article appeared in the Russian journal, *Vestnik Metallopromyshlennosti*, 1940, No. 7, and was translated by Tania Cosman.**

THE desire to speed up the cutting of metals from a few tons of surface feet per minute to hundreds and even thousands of feet per minute is not new. However, in spite of the importance of this problem, not a single physicist has thoroughly investigated this problem and contemporary research engineers have hardly touched this sphere. But recent results of experiments on plasticity and hardness of metals may put the science of cutting of metals on an entirely new basis.

The author has studied plasticity and hardness of metals for many years, but he mainly concentrated on alloys, chemical compounds and porous metals. In the course of this research, however, he formed a very definite idea of the processes taking place in hard metals during their deformation.<sup>2</sup> The study of the qualities of hard substances when subjected to dynamic stresses, developed the possibility of surface cutting of metals at a rate of several thousand feet a minute.

The basic problem can be approached by equating the work done by the cutting tool to the energy absorbed by the work and chips, thus:

$$\dot{U} = PL \quad (1)$$

Where  $U$  = the energy used up when the cutting tool removes chips from

the surface of the metal

$P$  = stress on the cutter

$L$  = distance traveled by cutter with respect to the work

Energy  $U$  can be divided into four parts:

$$U = U_1 + U_2 + U_3 + U_4 \quad (2)$$

Where  $U_1$  = energy of dispersion

$U_2$  = energy of plastic deformation

$U_3$  = energy of friction

$U_4$  = energy of elastic deformation

The first part  $U_1$  is the work done in bringing to the surface a quantity of molecules from the body of the machined metal producing a breakdown in the continuous metal to form a plurality of small particles, thus increasing the total metal surface. Chips break apart in the process of cutting, creating a new surface. When the chips break off, further surfaces are formed on the work. Finally the chips wrinkle up and the surface grows even more. Energy  $U_1$  must be supplied for all these purposes.

It is evident, however, that energy  $U_1$  plays an insignificant part in the total energy  $U$  used in the machining. Even in as coarse a metal as cast iron where chips break up into very small

particles, this  $U_1$  energy consumption is negligible.

In 1929 U. V. Gruda and the author<sup>3</sup> experimented on the mechanism of cutting. In order to reduce this investigation to the most general level, rock salt was used in the experiment. It was shown that the work  $U$ , amounted only to 0.12 to 7.0 per cent of total work  $U$ , even when it is assumed that chips were composed of only 32 molecules of NaCl. For engineering metals energy  $U_1$  can be completely disregarded because the majority of such metals and alloys have a much greater plasticity than rock salt.

## Plastic Deformation

The second part of the energy  $U$ , is consumed during cutting by the plastic deformation of the metal. In the working of a hard substance plastic deformation begins when the limiting stress of hardness or fluidity is reached. The deformation consists in changing the lattice structure of the molecules, reducing the size and changing the structure of the crystals. Plastic deformation is a non-reversible process which is usually accompanied by development of heat. As was shown by experiments carried out by A. A. Fedorov in the Siberian Physico-Technical Institute when metal cylinders are compressed plastically, all the mechanical compression work goes into heat (for instance in the case of lead and copper 100 per cent, aluminum 95 per cent and tin 90 per cent).

In the cutting of metals, plastic deformation takes place immediately in front of and under the cutting tool. It reaches a considerable depth below the machined surface. At the present time the author with a group of co-workers is studying plastic deformation in cutting, applying the method

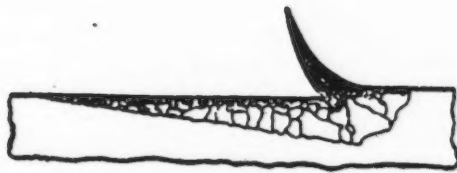


FIG. 1—Zone of plastic deformation below a chip which constantly increases in size.

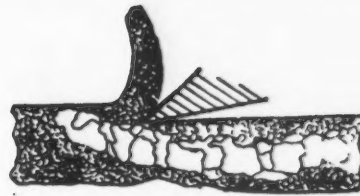


FIG. 2—Annealing of plastically deformed metal results in an increase in crystal size, up to 0.4 in.

of recrystallization which is performed in such a manner that the chips increase constantly in size (Fig. 1). The zone of plastic deformation, therefore, deepens constantly. When the thickness of the chips is equal to 0.118 in. in depth, the zone of plastic deformation in the aluminum reaches the depth of 1.18 in. Consequently the deformation reaches a depth which is 10 times greater than the thickness of the chips.

In order to remove any possible internal stresses in the case of aluminum the specimen was annealed for an hour at 450 deg. C., then was machined and later annealed again. Instead of plastic deformation internal stresses were set up, the lattice structure of the crystal changed and new grains came into existence. As a result of this recrystallization, large crystals whose linear dimensions were more than 0.4 in. (Fig. 2) were formed under the cutting tool.

The plastic deformation spreading into the body of the metal being machined produces grain growth and changes the mechanical properties of the metal considerably. The size of the grain depends on the degree of plastic deformation. In Fig. 3 the x-axis gives the amount of deformation and y-axis the grain size produced. Up to a certain deformation  $b$  the grain size does not change in the process of annealing. Then there is a sudden increase in grain size which decreases again as the deformation increases. When plastic deformation becomes very large, after annealing a fine-grain structure is produced. In order to obtain a coarse grain structure in iron, deformation should amount to 2-4 per cent. In pure iron the size of the grain can sometimes be 0.4 in. and more in diameter.

Immediately under the tool considerable deformation takes place and in the process of annealing a small grain structure appears. Below this layer there is a zone with large grains and then a third layer in which the structure is the same as it was prior to annealing because the

amount of deformation which occurred is very small.

In order to investigate the influence of the cutting speed on the depth of penetration of plastic deformation an aluminum disk was milled at a rate of 4900 surface ft. per min. Then this speed was gradually reduced to zero. Chips were 0.118 in. thick. In Fig. 4 is shown a section after annealing and etching. At the point where the milling speed was 4900 surface ft. per min. the depth of recrystallization was small but with decreasing speed the depth increased.

To show the effect of plastic deformation on the mechanical properties of a given material, extensometer readings were made on specimens of identical shape, one of which had been peened, the other not. Completely different stress diagrams resulted from the two samples. The one which had not been peened was machined at high cutting speed and light feed, producing fine chips, and resulted in diagram 1, Fig. 5, which is typical for plastic deformation. This sample has a normal yield limit and average elongation. The other, peened sample which was machined at slow speed and heavy feed, giving heavy chips, produced diagram 2, Fig. 5, indicating increased yield limit and correspondingly lowered elongation.

The influence of the working method is especially strong when the

part is subjected to thermal processes after machining. During annealing a peened part, for instance, may develop big grains and completely different properties. Thus  $U_1$  is that part of the energy which is used for plastic deformation and which is almost entirely expended in an annealing effect.

### Frictional Energy

The third part of the energy is used up in friction and is denoted as  $U_2$ . In spite of numerous experiments in the field of friction there is still no clear conception of the physical nature of this phenomenon. It seems as if the work in friction is used up in dispersion and plastic deformation. When a train moves along the rails, for example, they are being worn out, their surface is dispersed, flattened out, and plastically deformed. The deformation is especially pronounced in the slipping of the braked wheels. Electromagnetic methods of experimenting show that there appears in the rails a strong deformation by peening.

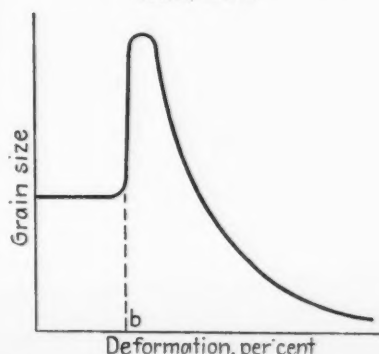
$$\text{Thus } U_3 = U'_1 + U'_2 \quad (3)$$

where  $U'_1$  is the work used up for dispersion and  $U'_2$  for plastic deformation.

Heat is always generated by friction, although often no wear or plastic deformation occurs. An analogous action takes place in rubbing two brushes against each other or in a spring. It can be explained in the following way:

Supposing that one end of a resilient rod be fixed in position, application of force to the other end bends the rod. If the stress is suddenly released, the rod will move to and fro, and potential and kinetic energy will interchange constantly. If no inner frictional nor outside gravitational forces were acting, the rod would never stop moving. But due to inner friction the stored-up energy of the rod is transformed into heat and raises the temperature of the rod. The heating of brushes by rubbing follows a similar pattern. A similar process also takes place in the ma-

FIG. 3—Effect of the amount of deformation on the grain size of the annealed metal.



chining of metals. When the tool moves over the work elastic deformations take place which change into vibrations and finally into heat.

Elastic deformation  $U_1$  is the fourth part of the work done by the tool and results in the generation of heat.

Since the work of friction can be subdivided into  $U'_1$  and  $U'_2$  (formula 3), a part of  $U'_1$  can be joined with  $U_1$  and  $U'_2$  with  $U_2$  in formula (2) which now becomes

$$U = U_1 + U_2 + U_3 \quad (4)$$

Energy  $U_1$  may be disregarded, as the energy spent on dispersion is an insignificant part of the total work, leaving the equation

$$U = U_2 + U_3 \quad (5)$$

Thus the basic factors are energy  $U_2$  used up in plastic deformation and energy  $U_3$  in elastic deformations. Obviously in cutting such plastic metals as lead, tin, aluminum, copper, iron and soft steel, all of which have a low yield limit, energy  $U_2$  predominates; in the cutting of such brittle metals as cast iron or heat-treated steel, energy  $U_3$  predominates.

Cast iron is machined more easily than soft steel; brass and bronze, more easily than copper. In general a brittle metal is machined with greater facility and gives out less heat than a plastic one. When considerable plastic deformation takes place, energy  $U_2$  will be consumed to a much greater extent than  $U_3$  used in elastic deformation.

Energy  $U_2$  is the main cause of heat occurrence and it impedes the cutting of metals at high speed. When iron or steel is being cut at the rate of 200-600 ft. per min. heat is produced at such a rate that the chips get red hot. To make the cutting of metals possible at high speeds the plastic deformation energy  $U_2$  should be greatly diminished.

### Relative Plasticity

Prof. A. F. Eoffe and his colleagues showed that the yield limit of rock salt is dependent on the temperature—the yield limit drops to zero (Fig. 6 curve 1), when the melting point of rock salt is reached (800 deg. C.) which was proved by X-ray diffraction patterns. At the same time it was shown that its toughness  $B$  is constant and does not depend on the temperature. From the theoretical point of view the impact strength can only depend to a small degree on the temperature. The curves 1 and  $B$  intersect at  $A$  which corresponds to a temperature of 200 deg. C. If rock salt is stressed in tension at temperatures below 200 deg. C. it breaks

without plastic deformation and acts like a brittle substance. At higher temperatures the yield point is reached first and plastic deformation occurs before the final break occurs.

A series of tests demonstrated that curve 1 is not an absolute entity. The yield limit depends on the rate of application of the stress. At slow rate of stress application it is reduced to such an extent that even salt behaves

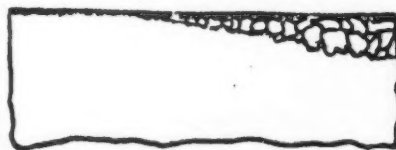


FIG. 4—Showing how depth of plastic deformation is related to the speed of cutting. Deformation is least at the highest speed.

o o o

like a plastic substance at room temperature. Dynamic stresses applied at high temperatures (500-600 deg. C.) will cause salt to act as a brittle substance so that its yield limit is increased. The dependence of yield limit on the temperature at slow rates of deformation is shown by curve 2 in Fig. 6 and high rates of deformation by the curve 3. In curve 2 the point of intersection with curve  $B$  is closer to the lower temperatures and in curve 3 closer to the higher ones. A typical example is pitch which liquefies under the weight of its own body and runs out of the spout. It is a plastic substance under very low rates of deformation, but if struck with a hammer, pitch breaks up without any plastic deformation, acting like a brittle body.

### Speed vs. Plasticity

Every liquid is a viscous plastic body, but at high speeds even a liquid can be transformed into a brittle condition. Water flows around a slowly moving oar, but if moved rapidly a break occurs. Recently a paper was published whose authors proved this possibility. They made a mixture of transformer oils of different concentrations and rosin. The jetting spray of this mixture was interrupted by bullets of low caliber guns or by fingers attached to a rotating disk. It was proved that when the bullet traveled 1000 ft. per sec. the spray was rendered brittle at any viscosity from  $10^{-2}$  to  $10^6$  poises. A liquid with viscosities from  $10^3$  poises becomes brittle when interrupted by small objects at the speed of 75 ft. per sec.

The conception of brittleness and

plasticity are relative. The higher the rate of stress application, the sooner a plastic metal approaches a brittle condition and the less it suffers from plastic deformation, the size of which depends on the continuity of the stress. However, some metals like lead and copper are difficult to render brittle even under very high rates of deformation. As is well known, a lead bullet even at the speed of 2600 ft. per sec. does not disintegrate when it hits a target as a brittle substance would, but flattens out, keeping its plasticity.

The method of reducing the value of  $U_2$  in formula (5) consists in the possibility of cutting at extremely high speeds of several thousand feet per minute or several hundred feet per second. The higher the cutting speed, the smaller the plastic deformation and heat quantity generated. At great cutting speeds, the energy is expended only on dispersion and on elastic deformation. Plastic energy consumption  $U_2$  at such high speeds of cutting is eliminated.

This was taken into consideration

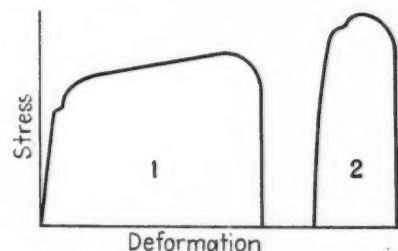


FIG. 5—Stress-strain diagrams for (1) unpeened sample and (2) peened specimen.

o o o

when the following experiments with high surface speed cutting were carried out. For the experiments a heavy lathe was constructed from a circular saw. The lathe weighed about  $1\frac{1}{2}$  tons and was equipped with casters.

In the first series of experiments, a cylinder of soft steel was turned at circumferential speeds of 4900 to 7200 ft. per min. Tool feed was 0.008 in. per rev. A high speed steel tool was used.

### High Speed Tests

At a speed of 4900 ft. per min. the following was observed: In the beginning of the experiment when the edge of the cutter was sharp, the chips were almost cold, very smooth and easy flowing. The surface of the work was free from defects and smooth. The 14.5 kw. motor operated easily



under the load, although according to previous calculations its power should have been insufficient for the cutting to proceed under normal speeds. The chips furthermore showed no traces of burns. This confirmed the previous conception that less heat is produced at high speeds of cutting. After machining the cylinder over a length of 1.96 in. which corresponded to 78 sq. in. in area, the cutter was worn out and produced no further chips. When the speed was reduced, the chips were heated and changed in color from straw-yellow to blue-violet.

At the speed of 4900 ft. per min. the tool remained keen only for a few seconds. After the experiment the surface of the cutter conformed exactly to the surface of the cylinder which had been previously ground at a low speed. The worn-out part of the cutter was an exact negative of the surface of the cylinder and the shape of the last-produced chip was imprinted exactly on the cutter.

At a speed of 7200 ft. per min. the tool life was almost zero. The tool

Thus the first series of experiments led to the conclusion that it is possible to sharpen high speed steel cutters by a rapidly rotating cylinder of soft steel. The same cylinder also quickly and effectively polished cutters made from hardened steel and no work was done on the cylinder. (To polish the tools a part of the cylinder was made cone shaped.)

### Milling Experiments

The experiments of the second series were made with a rapidly rotating milling cutter. To one of the ends of the cylinder was attached a disk cut out of an ordinary circular wood-saw and sharpened on the circumference. The diameter of the cutter was 14.5 in. and its teeth were cut with a triangular file, the pitch being 0.118 in.

This circular saw made 1450-2000 r.p.m. and the circumferential speed was 5600-7500 ft. per min. The depth of cut was 0.02-0.05 in. and the table feed 0.008 in. per tooth.

Milling performance was distinct from machining in a lathe. The stream of sparks produced by milling showed that there is a marked temperature rise. A sheet of paper, placed under the lathe to collect the chips, was burned in several places indicating that the chips were hot. A blue steel powder collected on the sheet, among which were some round particles that were from 0.015 to 0.020 in. diameter and several clusters of chips which had gradually curled upon and stuck to the edge of the cutting disk. Curlings with a diameter of 0.008 in. stuck together and formed clusters. In the machining of the steel the surface was heated and the hardness of the steel increased.

Experiments were carried out also with cast iron and non-ferrous metals. The most effective was the experiment in which a cast iron slab was machined by a rapidly revolving milling cutter. The table feed as before

was 0.008 in., the cutting depth between 0.02 and 0.10 in. The results of the operation depended on the quality of the cast iron and were very varied. In the machining of a cast iron slab of one quality, pronounced development of deep red sparks occurred which did not fly very far and were almost drop-shaped. Another kind of cast iron yielded practically no sparks. At the point of cutting there was a dark red streak indicating that the metal was being locally heated. The machined face of the iron was smooth and clean, resembling a polished surface.

The machining of non-ferrous metals, such as copper, brass, aluminum and zinc, produced no sparks. The copper surface showed signs of warping in several places after machining. The surface of all the other materials was very smooth. The chips from cast iron were a powder with grains of 0.04 in. and more in diameter. The chips from brass were a mixture of powder and curlings. Copper produced chips similar to those of steel—i.e., bent chips up to 0.4 in. sq. which resembled welded wires. Aluminum shavings consisted of powder and rather big particles up to 2 3/4 in. in length.

In these experiments the teeth of the milling cutter were hardly worn in the machining of constructional, and even hardened steels, although the cutter was made from a rather soft steel which was easily sharpened with a file. Experiments showed that at a circumferential speed of 6500 ft. per min. or about 110 ft. per sec., steel and copper do not reach a brittle condition. They need a higher cutting speed.

The relationship between the mechanical properties of normalized steel (0.2 per cent C) and the rate of deformation was investigated by F. F. Vitman,<sup>6</sup> who built a special rotating stand which had a circumferential speed up to 330 ft. per sec. Fig. 7 shows the results arrived at. The x-axis shows the speed and the y-axis shows the degree of deformation when a sample is cut at right angles. The curve shows that plastic deformation in this normalized steel stops when the speed approaches 165 ft. (50 meters) per sec. Consequently, to make the machining of the steel as easy as that of cast iron, the machining speed would be more than 10,000 ft. per min.

The third series of experiments was made with high speed milling cutters each having from one to four teeth.

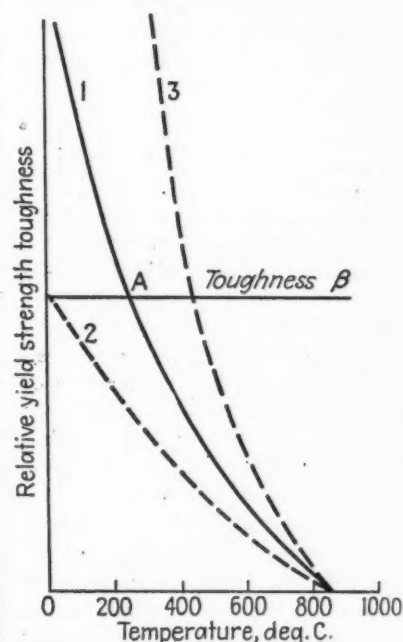
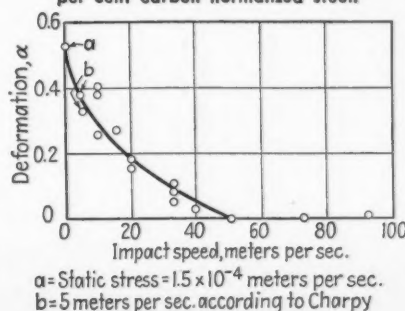


FIG. 6—Relation of yield strength to temperature of rock salt.

smoothed out immediately without changing the surface of the cylinder. It is interesting to note that under high speed cutting no particular change occurred compared with normal cutting performance. The chips, due to the high speed, were thrown a good distance away from the tool. When the cutting turned into a polishing effect on the tool, the usual sparks occurred.

FIG. 7—Relationship of impact speed (stress) and deformation for a 0.20 per cent carbon normalized steel.



a = Static stress =  $1.5 \times 10^{-4}$  meters per sec.  
b = 5 meters per sec. according to Charpy

# Deep Drawing Magnesium Alloy Sheets

... Tests made on three grades of magnesium alloys indicate that reductions in blank diameter from 50 to 55 per cent are possible in cupping operations performed in double action mechanical presses, provided the material is heated to 500-550 deg. F. In redrawing shells, reductions up to 50 per cent are possible, giving overall reductions of 77.5 per cent.

THE tremendous increase in the production of aircraft during the last few years has resulted in an accelerated demand for light weight parts fabricated from magnesium alloys. This increased demand has resulted in numerous technological advances in the fabricating of magnesium alloys by casting, forging and press forming.

For most sheet metals and alloys, forming and deep drawing is performed at room temperature. If parts requiring severe forming or drawing are to be made in two or more draws, anneals are generally required between draws because of the work hardening that takes place. In some cases sheet products also require a special low temperature anneal for the relief of residual stresses which would cause eventual failure of the finished part.

By L. J. WEBER  
Chief Metallurgist  
and  
H. VANDEN BERG  
Metallurgist  
The Aluminum Cooking Utensil Co.,  
Subsidiary of Aluminum Co. of America

Because the magnesium sheet alloys have a limited capacity for cold work at room temperature, the forming and deep drawing of magnesium alloy sheet are usually carried out at elevated temperatures. Consequently, in order for deep drawn magnesium alloys sheet products to be produced successfully the drawing tools must be maintained at a suitable hot working temperature. Hot drawing of magnesium alloy sheet has the advantage of high reduction per draw without the use of intermediate anneals.

## Drawing Alloys

The various magnesium alloys are available in a variety of commercial forms such as extruded bar and shapes, castings, forgings, sheet and plate. The sheet products are supplied in three standard alloys, the products of the American Magnesium

Co. being designated as AM3S, AM-C52S, and AM-C57S in hard (as rolled) temper, and soft (annealed) temper. The AM3S alloy is used for moderately stressed parts requiring good welding properties. AM-C52S has greater strength than AM3S, but is not as readily torch welded. The AM-C57S alloy has greater strength than AM-C52S, but is not as easily torch welded as AM-C52S. Table I contains the nominal compositions and typical mechanical properties of the annealed and hard tempers of the sheet alloys AM-3S, AM-C52S and AM-C57S.

All three alloys have relatively high resistance to corrosion and can be readily fabricated by forming or deep drawing provided the tools are maintained at proper hot working temperatures. Simple shallow shapes can be produced from annealed sheet by forming or drawing at room temperature provided the radii are liberal and the reductions are not too large.

Hydraulic presses generally have been recommended for severe forming and deep drawing magnesium sheet alloys as they have a slow, uniform punch stroke. Normally, mechanical presses have higher punch speeds, which means increased production rates. However, these higher punch speeds might increase the possibility of fracture during the initial stages of the drawing process. No data have been presented to substantiate these claims and they seem to be based mainly on opinion rather than experience.

In order to obtain data as to the practicability of using mechanical

TABLE I  
Composition and Mechanical Properties of Commercial Magnesium Alloy Sheet

Alloy Designation and Temper	Alloying Constituent, Per Cent*			Mechanical Properties		
	Al	Mn	Zn	Tensile Strength, Lb. per Sq. In.	Yield Point, Lb. per Sq. In.	Elongation, Per Cent
AM-3S-O	...	1.5	...	32,000	17,000	16
AM-3S-H	...	1.5	...	36,000	27,000	9
AM-C52S-O	2.7	0.3	1.0	38,000	25,000	18
AM-C52S-H	2.7	0.3	1.0	46,000	34,000	10
AM-C57S-O	6.5	0.2	0.7	42,000	26,000	10
AM-C57S-H	6.5	0.2	0.7	50,000	35,000	6

\* Magnesium and normal impurities constitute the remainder.

presses for deep drawing magnesium sheet, a series of drawing tests were conducted using double-action toggle presses. All tests involving only one draw were made on a toggle press of 125-ton capacity. This press was operated at its normal speed of 17 strokes per min. which gave a maximum punch velocity of 89 ft. per min. The punch velocity at the beginning of the draw was calculated to be approximately 63 ft. per min.

The die, blankholder and punch used for these tests were made from mild steel and all working surfaces were polished. Press tools for drawing magnesium alloy sheet are usually made of mild steel, although heat resisting cast irons have been used. Punches can be made from steel, cast iron or aluminum. Allowances in dimensions must be made for the expansion at elevated temperatures of the magnesium and the tool material. The clearances between the punch and die at room temperature was 0.078 in. when drawing sheet 0.064 in. thick, and 0.054 in. when drawing of 0.040 in. sheet. Although this clearance may appear large, it produced shells with little or no wrinkling provided proper blankholder pressure was used. Gas ring burners fastened to the die and blankholders maintained the tools at the various temperatures used in the drawing tests. The punch was not heated directly by burners, but reached a temperature range of 150 to 350 deg. F. depending upon the temperature of the die and blankholder. Fig. 1 shows the general arrangement of burners and tools. The setup shown was used on a double draw test to determine maximum reductions, but it serves to illustrate the general arrangement used.

Tool Lubrication

The proper lubrication of the tools at the high temperatures necessary for deep drawing presents somewhat of a problem as most of the common lubricants ordinarily used at room temperature decompose under heat, leaving a gummy carbonaceous residue on the working surfaces. Several pigmented mixtures were tried, but they generally carbonized, leaving a gummy residue on the tool surfaces. A drawing lubricant consisting of 20 per cent (by weight) flake graphite suspended in a mineral oil-tallow mixture proved satisfactory. Flake graphite alone may be used to lubricate the blanks, but it must be suspended in a volatile solvent so that it can be applied by brush or spray. The use of graphite is considered

• • For other data on the drawing of magnesium alloys the reader is referred to the following articles which have appeared in THE IRON AGE: "Hot Forming of Magnesium Alloy Sheets," by E. P. Resos, Consolidated Vultee Aircraft Corp., July 27, 1944, p. 42; and "Deep Drawing and Forming of Magnesium Sheet," by Arthur E. Meyer, Meyer Sheet Metal Machinery Co., Nov. 30, 1944, p. 44.

satisfactory as it provides a lubricating film which will withstand the temperatures necessary when deep drawing magnesium sheet.

Although graphite is an excellent drawing lubricant, it is objectionable because of the cleaning difficulties it introduces. The graphite has a tendency to embed in the soft magnesium surface which makes it difficult to remove. Usually alkaline or solvent degreasing will remove the major portion of the drawing lubricant and a 1 to 2 min. dip in 20 per cent chromic acid at 150 deg. F. will generally remove all traces of graphite. It is essential that the shells be cleaned as soon as possible to prevent pitting caused by galvanic action which might take place under certain conditions where the graphite is embedded in the surface.

Further tests on drawing lubricants revealed that a mixture of high flash-point oil consisting of asphaltic still residue and black oil with 0.75 lb. of mica added per gal. gave a satisfactory lubricant for drawing tank heads. The vehicle oil of this mixture is very viscous having a S.S.U. viscosity of 20,000 sec. at 100 deg. F. The mica is very fine and is of the type used for anti-friction surfaces at high temperature. The lubricant was used for temperature up to 500 deg. F. and did not form an objectionable residue on the tool surface.

The surface condition of the shells was satisfactory and lubricant could be completely removed from the drawn shells by washing in mineral spirits or benzene.

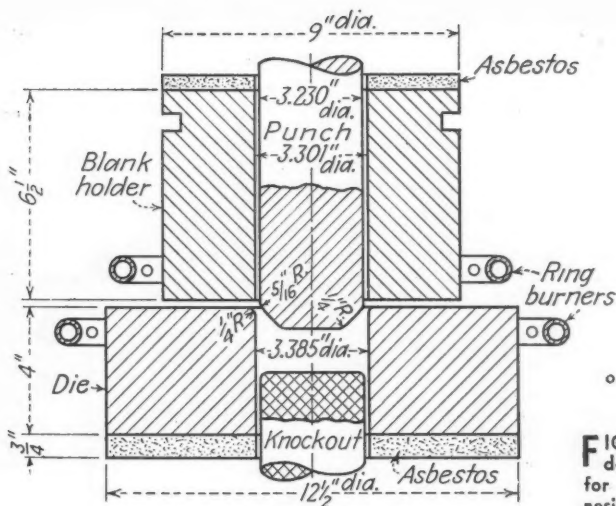
Commercial magnesium sheet alloys AM-3S-0 and AM-52S-0 of 0.064 in. thickness were used for the preliminary tests to determine approximately the maximum reductions in blank diameter that can be made in a single drawing operation. This preliminary test disclosed two unusual types of failures other than the characteristic fractures which occur when cold drawing other metals. These two types of failures are shown in Fig. 2. The angular fracture occurred in the flange and the area adjacent to the flange. This fracture occurred when the tool temperatures were too low for the reduction attempted. The other type of failure occurred in the lower area of the sidewall or the bottom of the shell when the tool temperatures were too high. At room temperature the blanks would shatter into a number of pieces if the reductions attempted were too great. The data obtained from this preliminary test indicates the following conclusions:

- 1—The blankholder pressure should be maintained as low as possible and still avoid wrinkling.
- 2—The approximate maximum reduction in blank diameter that is possible at room temperature was 22 per cent for the AM-3S-0 and 18 per cent for the AM-C52S-0.
- 3—The approximate maximum reduction in blank diameter that is possible at 550 deg. F. for AM-3S-0 was 54 per cent and 59 per cent for AM-C52S-0.
- 4—Magnesium alloy sheet of 0.064 in. thickness is sensitive to surface defects such as slivers, scratches, and rough sheared

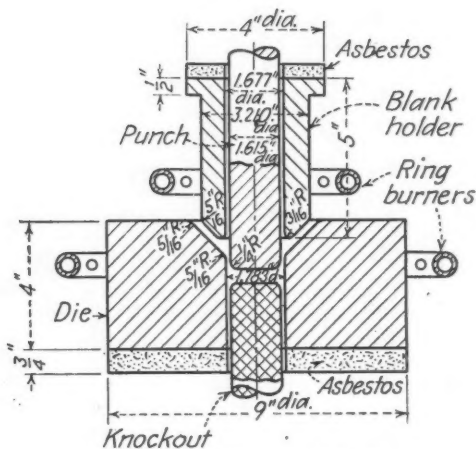
TABLE II  
Mechanical Properties of Deep Drawn Magnesium Alloy Shells

Alloy	Specimen From	Tool Temperature, Deg. F.	Reduction, Per Cent	Mechanical Properties			
				Tensile Strength, Lb. per Sq. in.	Yield Strength, Lb. per Sq. in.	Elongation, Per Cent	BHN
AM-3S	Sidewall.....	700	63.6	39,200	31,200	9	49
AM-3S	Bottom.....	700	63.6	32,400	17,600	15	44
AM-3S-H	Hard temper sheet.....	...	...	36,000	27,000	9	...
AM-C52S	Sidewall.....	600	61.5	43,700	32,800	7	60
AM-C52S	Bottom.....	600	61.5	37,600	19,800	18	58
AM-C52S-H	Hard temper sheet.....	...	...	46,000	34,000	10	...
AM-C57S	Sidewall.....	600	59.0	44,200	33,600	9	61
AM-C57S	Bottom.....	600	59.0	41,000	28,000	10	62
AM-C57S-H	Hard temper sheet.....	...	...	50,000	35,000	8	...





FIRST DRAW TOOL SET UP



SECOND DRAW TOOL SET UP

FIG. 1—This is the double tool setup for drawing magnesium sheets in two press passes. The setup was used on a double draw test to determine maximum reductions.

edges when drawn at temperatures below 300 deg. F.

#### Reduction vs. Temperature

Another series of draw tests was made in order to obtain more definite data on maximum reductions possible at various temperatures. Revisions were made in the burner adjustments so that higher tool temperatures could be obtained and closer control maintained. For these tests, lighter gage sheet (0.040 in.) was used and the magnesium alloy AM-C57S-0 was included. The lighter gage sheet was used to facilitate rapid and uniform heating of the blank by the conduction of heat from the tools.

All blanks were allowed to remain on the die with the blankholder contacting the blank until the outer area reached the die temperature. This time interval was 10 sec. before the draw was started. By using this method, the area of the blank under the punch would be at a lower temperature than the outer area of the blank. This procedure was necessary in order that the central portion of the blank would have sufficient strength to withstand the impact of the punch and the outer area would have high plasticity necessary to withstand the deformation during the draw without fracture. The die and blankholder were the same as used in the previous tests but a punch with a slightly greater diameter was used so that the clearance between die and punch at room temperature was 0.054 in. Die and punch radii were approximately six and nine times the sheet thickness, respectively.

A series of cups were drawn be-

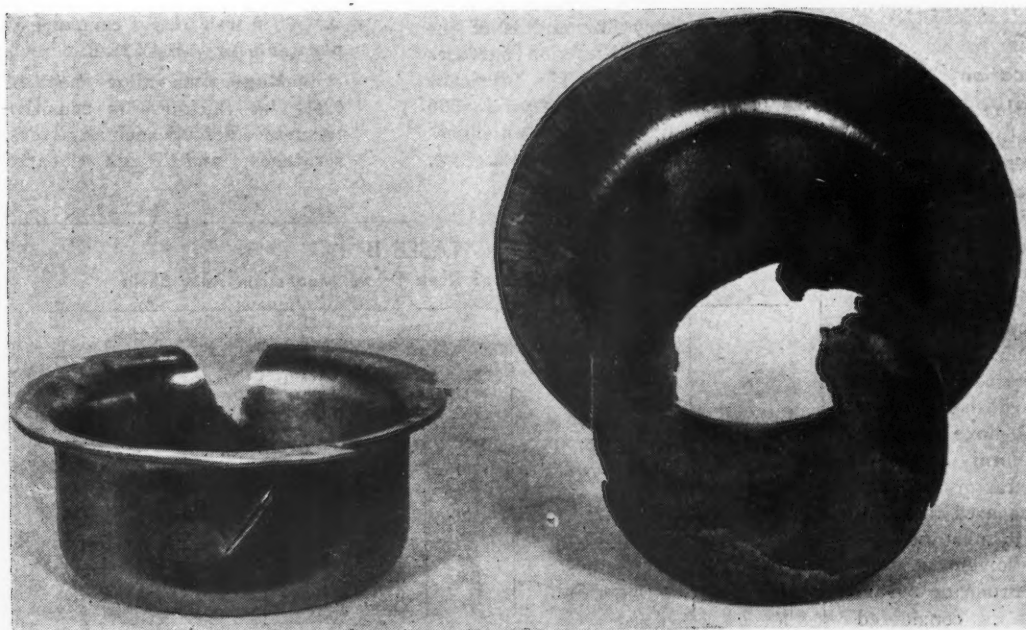


FIG. 2—These failures resulted from incorrect tool temperatures. The failure shown at left was caused by tool at a temperature of 350 deg. F., while that on the right was the result of tool temperature of 750 deg. F.

FIG. 4—These shells, produced from AM-3S-O sheet, show the difference in depth when tool temperatures were increased. Left shows a reduction of 25.1 per cent with a tool temperature of 75 deg. F. Center, reduction was 40.5 per cent when the tool temperature was raised to 450 deg. F. Right, at a 700 deg. F. tool temperature, reduction of 63.6 per cent was possible.



ginning with the die and blankholder at room temperature. The temperature of the draw tools was increased to 250 deg. F. and then raised in increments of 50 deg. F. until 800 deg. F. was reached which was the maximum temperature which could be obtained with this setup. Blank diameters were gradually increased at each temperature interval until consistent failure occurred. The percentage reduction in blank diameter was then calculated by using the following formula:

$$\frac{d_B - d_P \times 100}{d_B}$$

Where  $d_B$  = original blank diameter.  
 $d_P$  = punch diameter.

The curves shown in Fig. 3 indicate the maximum reduction obtained on the three alloys at the various temperatures. One fact revealed by this test was the high reductions possible when using mechanical draw presses operating at normal speeds. The cups shown in Fig. 4 were produced at room temperature, 450 deg. F. and 700 deg. F., respectively, from the AM-3S-O sheet and show the increase in depth of cup with increase in tool temperature. Tension tests made from specimens cut from sidewalls and bottoms of the deepest cup indicate that the sidewall properties are comparable to those of hard rolled sheet while the properties of the bottom are similar to those of the annealed temper. Table II summarizes the results of these tests and the properties of hard temper sheet are included for comparison.

Although shells with depths up to one and one half times their diameter can be produced in a single draw, in

many cases, it is necessary to make two draws in order to obtain shells of the desired depth. A test was carried out using 14 gage (0.064 in.) AM-3S-O, AM-C52S-O and AM-C57S-O sheet to determine if multiple draws could be made to produce deep drawn magnesium shells. In the first drawing operation the blank diameter was reduced 50, 55 or 60 per cent, depending upon the diameter of the blank used. The die for the second draw was designed so as to reduce the diameter of the shell of the first draw 50 per cent giving an overall reduction of 75, 77.5 and 80 per cent. Fig. 1 shows a sketch of the tool setup for the test. The die, blankholder and punch for the first draw were the same as those of the first series of tests but the punch was modified by replacing the  $\frac{1}{4}$  in. radius by a 45 deg. taper in order to shape the bottom of the first draw cup to the

45 deg. entrance angle of the second draw die. The second draw tools were also of unhardened steel and maintained at a temperature range of 500 to 550 deg. F. by means of gas ring burners. A 148-ton double-action toggle press was used for the second draw and was operated at its normal speed of 14 strokes per min., giving a punch velocity approximately that of the 125-ton press. All blanks were heated to tool temperature (500 to 550 deg. F.) in an electric air circulating conveyor type furnace. No difficulty was experienced in producing cups with 50 and 55 per cent reductions from the AM-3S-O and AM-52S-O blanks. However, no successful 60 per cent reductions could be made from either of these alloys. Larger reductions have been made in a single draw, but not with a 45 deg. bevelled punch. No successful first draw cups of 50 or 55 per cent reduction were

FIG. 3—Effect of tool temperature on the deep drawing characteristics of magnesium alloy sheet. Temperatures were determined by a contact type pyrometer.

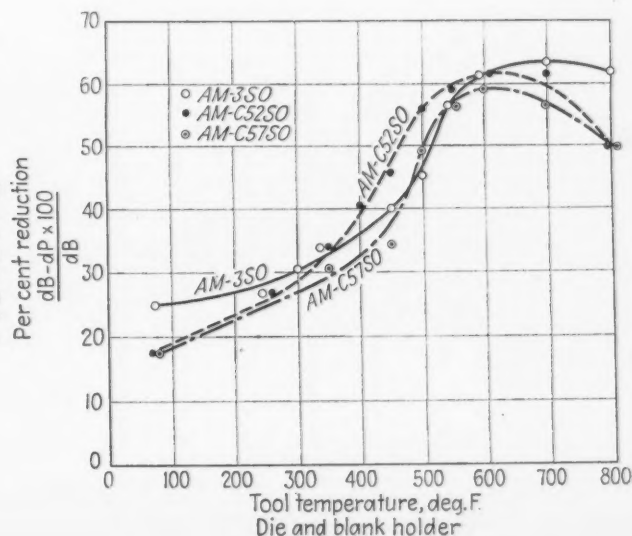




FIG. 5—These shells were produced from AM-C52S-O sheet in two draws. The reduction of the 7.25-in. blank diameter (left) in the first draw (left center) was 55 per cent. The final draw (right center and right) reduced the first draw shell diameter 50 per cent, for a total overall reduction of 77.5 per cent.

produced from the AM-57S-O blanks, and reductions lower than 50 per cent were not attempted.

#### Second Draw

The second drawing operation consisted of reducing the diameter of the drawn shell 50 per cent. The procedure which gave the best results was to let the shell sit in the die for 15 sec. with the blankholder in contact with the shell before the draw was started. By this method the AM-52S cups with 50 and 55 per cent reductions could be successfully drawn. Fig. 5 shows the successful

shells produced by the 55 per cent and 50 per cent combination of reductions on the AM-52S sheet which gave an overall reduction in blank diameter of 77.5 per cent. Several first draw cups of these two alloys were heated in an electric furnace to 500 to 550 deg. F. and then placed in the second draw tool to determine if this 15 sec. interval could be eliminated. Some of the AM-C52S cups would draw to a depth of approximately 1 in. before they would fracture while the AM-3S-O cups would fracture without any draw taking place. This condition was also

encountered during the single draw tests when the blanks were heated. Generally if that portion of the blank which contacts the punch does not have sufficient strength to withstand the initial impact of the punch and the stress of the drawing operation, the punch will pierce the blank with no draw taking place. If the center area of the blank becomes heated, there is corresponding loss in strength and the metal can no longer withstand the load of the punch and failure will result.

The 77.5 per cent maximum reduction, as shown by these tests, is not necessarily the absolute maximum as the second draw reduction might be increased to 55 per cent giving an overall reduction in blank diameter of 80 per cent. From our observations, it appears that the 50 per cent reduction is quite close to the maximum as the second draw is more difficult than the first.

The results of these series of drawing tests demonstrate that magnesium alloy sheet can be deep drawn successfully in single or double draws by mechanical presses operating at normal speeds. In the temperature range of 450 to 550 deg. F., the AM-C52S has the best deep drawing properties of the alloys tested. This temperature range is a practical working temperature for lubricant, tools, and presses. It should be understood that the maximum reduc-

(CONTINUED ON PAGE 142)

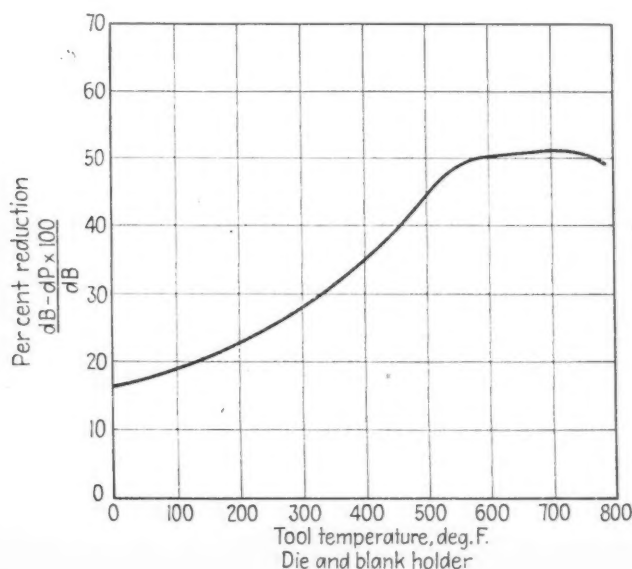


FIG. 6—Suggested reductions for single draws and recommended tool temperatures for production conditions.



# High Reproducibility In Precision Casting

FOR some reason it seems that every time a new process is discovered the advantages and possible applications of it are grossly exaggerated until it is fairly well along in development. Precision casting is no exception to this, being applicable at the moment only to a relatively limited field, and is most emphatically not a cure-all.

The impetus given to this process by the current war has been enormous. The Air Corps, in the opinion of the writer, was the first of the Armed Services to become interested in the process due to its urgent need for large quantities of turbosupercharger blades. These must be made of heat resistant alloys that are difficult, if not impossible, to forge and machine.

This problem was presented to the Austenal Laboratories, Inc., who not only succeeded in casting the alloys originally specified by General Electric, but also proposed the use of their alloy Vitallium. Prior to the war, certain of the dental technicians, like Austenal, had been working with the casting of nonferrous alloys, such as Vitallium, which is made of cobalt, chromium and molybdenum, and had been able to cast this material successfully into precision shapes required in dentistry. Since Vitallium has a melting point slightly over 2400 deg. F., it was obvious that the process was getting out of the lower melting point phase and approaching steel casting temperatures. Vitallium proved to be a highly satisfactory alloy for supercharger buckets and gave the process a background of experience which had been accumulated by Austenal for several years preceding the war. Austenal licensed several companies, helped them get into production quickly, and so managed to insure the adequate supply of blades. It is difficult to truly assess the value of this contribution to the war effort, but to be conservative, it is certain that it has contributed greatly to the production of turbosuperchargers in sufficient quantities, and on time to permit our planes to "go upstairs" in a hurry, and that is no minor contribution.<sup>1</sup>

The process has gradually progressed from the batch process used by

**... Many steps in the process lend themselves to rigorous scientific control. Future possibilities are appraised in this article which is an abstract of a paper read by the author before the foundry panel of the Chicago War Production Conference, March 29.**

dentists and jewelers towards the continuous straight line production technique which is necessary to large

scale production. In this respect, the industrial concern has at least one great advantage over the dental technicians in that shrinkage may be compensated for by correction of the pattern size, which is, of course, not the case in dental work where the cast pieces must reproduce exactly the dimensions of the wax pattern.

A great deal of credit is due to the companies who worked on this process and cured its problems over the trying years. To mention only a few of these companies, much of the initial work was done by General Electric in cooperation with Austenal. Allis-Chalmers has contributed greatly to the required production, as has Haynes-Stellite and many others. Suffice it to say, however, that the production is going forward on a large scale and is meeting our needs at costs which immediately prior to the war were considered practically impossible of attainment.

## Ordnance Department Interested

The Ordnance Department having somewhat similar problems was greatly interested in precision casting, but its requirements naturally differed from those of the Air Corps. Ordnance was interested primarily in the casting of many different intricate parts from SAE and NE alloy steels which proved to be the most difficult of all to cast.

The nonferrous alloys, including Vitallium and stainless austenitic steels, appear to be noncorrosive to the molds employed and fairly easy to cast, but the SAE steels including

By CAPT. W. A. MOREY  
Chicago Ordnance District

the high and low carbon are highly corrosive and very difficult to handle.

A little over a year ago, it was felt that the process had progressed far enough to warrant comprehensive tests on certain small intricate parts needed by Ordnance. At that time, it appeared that the vendors were able, within reason, to produce castings of SAE 4140 steel and other similar alloys to tolerances on the order of 0.003 in. and having at least an "f" (machine) finish on a production basis.

Although there had been previous test work conducted on various parts for cannon breeches, the carbine was

<sup>1</sup> Seven articles on precision casting published in the past year in THE IRON AGE, including the one on the turbosupercharger buckets, are now available in a single booklet, price 50c, Address Readers' Service, THE IRON AGE.

selected for test purposes since many of its parts were perhaps better adapted to precision casting and were being made in sufficiently large quantities to get an overall picture. The results of these tests were quite surprising.

Many of the parts of the carbine are quite highly stressed. Certain of the parts, such as the extractor, hammer, sear and trigger, were selected for test and approximately 5000 sets of parts were cast and assembled into completed weapons. Approximately 3700 carbines containing precision cast parts were issued to troops for field trial. After firing about a quarter million rounds in these carbines, total damages occurring were three broken extractors.

Since these tests appeared to be satisfactory, a check is being made

for use in forming various machine gun parts. These tests are still in process, but at this moment it appears that the results will be equally, if not more, satisfactory.

This brings us up to the status of precision casting today. As previously mentioned, the Army Air Corps is using this process to produce practically all of its supercharger buckets and is at least considering the production of similar parts, some of which are substantially larger. The ability of the process to supply the demand proves that it at least warrants classification as a production process, and not mere laboratory or pilot line curio.

Although the process should still be classified as an art and not as a science, because technique plays a large part in its successful operation, one is safe in stating that practically any common metal that can be melted can be precision cast if its melting point is below 3000 deg. F.

This broad statement of course opens up several interesting possibilities, particularly during the war, since it permits the use of stainless steel in places where it would not ordinarily be employed due to difficulty in machining. By the same token, extremely hard alloys which would not be used before may now be employed in spots where great wear is encountered and so attain greater durability. Another interesting development of this process is the ability to form magnetic materials such as Alnico with a high degree of precision and still retain excellent magnetic properties. This, it may be added, has been successfully accomplished and will undoubtedly play an important part in design of future electrical components.

The finish obtainable today probably should be classified as an "f" finish or better. Finishes as fine as 3 microinch have been cast, and 65 microinch finishes are currently obtainable on a production basis.<sup>2</sup>

### Reproducibility

Perhaps the most important single requirement today is the matter of control as applied to every step of the procedure, as well as the materials

<sup>2</sup> For a comprehensive discussion on surface quality control see the article "Measuring and Designating Surface Finish" by James H. Broadston, THE IRON AGE, Oct. 19, 26 and Nov. 2, 1944.

entering into it. With control, reproducibility is exceptionally high and, in many instances, exceeds the reproducibility normally obtainable by machining.

While there is not yet sufficient

data available to make any positive statements about physical properties, it appears that in most instances the tensile strengths and yield points will be comparable to bar stock having the same chemistry. Castings of SAE 4130 steel can be made to yield tensiles from 90 to 145,000 lb. per sq. in. depending upon their heat treatment and will have a reduction of area from as low as 5 to as high as 35 per cent. This could be compared with SAE 4130 steel bar stock having a tensile of 135,000 lb. with an elongation of 22 per cent. In general, however, it should be assumed that the elongation and reduction of area will be lower, perhaps 60 per cent of that obtainable in bar stock.

Metallurgy is not yet under satisfactory control in all cases. The investment mold material is a good insulator which results in slow cooling and, as would be expected, in a normal dendritic structure which can be corrected by standard heat treatment. The grain size remains fairly large, sometimes as high as three on the McQuaid-Ehn scale. To at least some degree, this can be corrected by casting in a cooler mold, if permitted by the contour and size of the piece, and by breaking the casting out of the mold in an early stage of cooling. Development of a mold of greater heat conductivity would be very beneficial in this respect. When the density is high, as should be the case with good control, the cast parts exhibit an unusually high resistance to wear, perhaps due to the moderate chilling effect of the mold on the skin.

The existence of porosity varies with the supplier, but where good control is exercised, rejects for porosity will be less than 1 per cent based on 100 per cent X-ray inspection. Chemistry is under fairly good control and is attained usually by melting of bar stock or similar scrap of known chemistry adding the proper make-up for correction of heating loss. Aluminum normally used to deoxidize steel melts, is sometimes present in relatively large quantities. This, however, is not in all instances objectionable and could probably be corrected if the necessity arose.

Dimensions are finally coming under close control. At least one firm is today able to produce steel parts having tolerances of 0.001 in. to the inch or better, in most instances. This tolerances control, of course, varies with the difficulty of casting the part and with the time devoted to the study of proper spruing, temperatures, etc. Close tolerances should not be required if not needed, as it increases rejects and therefore cost.

The Armed Forces as yet have not issued any blanket approval of this method nor could they within reason be expected to do so since the results obtained vary with the maker of the casting, but they have approved the use of this process for the manufacture of certain specific items under special controlled conditions involving a high order of inspection.

### Cost Items

The cost of the process today is still quite high and, while it varies within wide limits, a figure of 10 to 15c. per oz. is not too far out of line for a rough estimation. This high cost is due not only to the current lack of mechanization of the process but to the high cost of the materials involved. Reclamation of pattern material is not always practical; some loss of material being involved in every cast. In addition, the sands and binders are quite expensive. Skilled labor, fortunately, is not generally required for the process; semi-skilled or unskilled can be quickly trained to perform the necessary operations. Since spruing is very critical, both as to size and position, it is not always possible to stack the patterns in the most economical manner. This often means that only a small percentage of the metal cast goes into finished castings. The amount of metal per pound of sand is correspondingly small. All this contributes to the seemingly high cost.

On the other hand, there are cases where owing to the elimination of intricate machining operations, the cost of the finished precision casting is much lower than that of an identical part made by conventional methods. In the accompanying table, for example, there are some cost figures developed by one of the arsenals for castings which, while not precision castings in the strict sense, are investment castings involving similar procedures and costs. They were designed simply to supply the machines with a more closely formed part for machining.

The present equipment used in the process is still in its development stage and a great many of the problems now present in the industry will disappear as the equipment is improved. Since the process is still more of an art than a science, rejections will sometimes run quite high, and are so variable that it is difficult to strike an average. One plant has reported scrap running as low as 8 per cent and as high as 80 per cent, while others figure 40 per cent as an average. This may not present a true picture, however, since the in-

spection costs involved in these cases have been exceptionally high, the tolerances being very close. A figure of 15 per cent would be as satisfactory an average as could be obtained today. These statements, it is realized, are quite vague, but it is extremely difficult to obtain a clear picture of the status of this industry today due to secrecy and patent work which are always present in a new and growing field.

For practical purposes, the process today is currently limited to smaller castings on the order of  $\frac{3}{4}$  lb. or less. On the other hand, many larger castings have been made experimentally and could be produced commercially today if there were sufficient economic advantage.

A word of caution, but this time on the credit side, if the mechanical properties of precision cast parts do not happen to be equivalent to those of bar stock which has been previously used in making the part, it should not be immediately assumed that the process is not suitable for making the part. In many instances, the existence of a quality in the metal, such as tensile strength or elongation, may be actually immaterial in the functioning of the article. The real test is to cast the part and make a comparison with the normal method of production. Thus, a true picture of value can be obtained.

#### Appraisals for Future

This process is obviously excellent for the formation of relatively small parts made of unmachinable materials, such as Alnico, Vitallium and some of the austenitic steels. Furthermore, it is well adapted to the manufacture of small intricate parts where labor represents a large percentage of the total cost. Either of these factors alone or in combination indicates that serious consideration should be given to precision casting.

Before this process makes an im-

Cost of Finish Machined Parts Compared With Finished Investment Castings

Part	Part Manufactured by Conventional Machining Methods	Precision Casting	Finishing Operation on Precision Casting	Total Cost of Precision Cast Part
A	\$3.79	\$1.05	\$1.13	\$2.18
B	6.50	1.00	2.16	3.16
C	4.97	.75	1.35	2.10
D	4.66	.45	1.09	1.54
E	11.90	1.60	2.09	3.69
F	10.76	1.32	2.64	3.96
G	2.30	.65	1.11	1.76
H	14.27	2.00	7.56	9.56
I	7.35	1.84	1.49	3.33

pression on American industry, it is essential that at least the existence of this process and its limitations get back to the designers who actually lay out the pieces. This is important for many reasons. First of all, it gives the designer increased freedom in his choice of materials. Secondly, he can combine in some instances several parts which were previously made as individual units for purposes of machining and form them into one unit. This is true because the patterns can be assembled by means of suitable jigs and fixtures into complex shapes after forming individually and the assembly cast as a unit. It is important that the designer recognize that this is a casting process and, wherever possible, he should use good casting design, particularly in the incorporation of fillets, since sharp corners are always a source of potential weakness in an investment. Webbing may be employed to lighten weight which, of course, would not be practical in ordinary design for machining.

He should not, however, attempt to design parts for precision casting that could be just as easily designed for production on automatic screw machines, punch presses or similar equipment, since precision casting cannot compete on a cost basis.

In addition to the possibility of

substantially reducing machining cost and obtaining a better product, there is also the interesting possibility of curing an inventory problem. For example, if there is an item or items which could be precision cast and for which a relatively large but sporadic demand exists, it is quite possible in place of carrying a large stock of the product, to store only the die necessary to form the patterns. Having the die, patterns can be supplied and therefore castings will be made available in a relatively short time—on the order of ten days, which in normal times is often sufficient. Once this process is started, production can be built up rapidly with a relatively small setup. The speed with which parts can be obtained is still another factor in its favor.

There is a little doubt that as more experience is accumulated larger pieces will be cast. Eventually, this may provide a limited form of competition to some of the smaller articles normally cast in foundries. It is quite probable that 1945 will see the commercial production of  $2\frac{1}{2}$ -lb. precision castings, and that within five years 10-lb. precision castings will be available. There is considerable doubt, however, that the process will ever be applicable to large pieces of the type ordinarily handled in the average foundry.

## Forge Furnaces on Springs Isolate Drop Hammer Vibrations

INSTALLATION of steel spring vibration control equipment, manufactured by the Korfund Co., Inc., of Long Island City, N. Y., materially increased the useful life of 17 furnaces located adjacent to a battery of forging hammers in a drop forging plant. Accelerated war production schedules, with resultant increase of shock vibration transmitted from the

hammers were causing the arches of the furnaces to collapse after three months of operation.

It was considered impractical at that time to use the positive vibration control method of mounting the hammers on isolating equipment. Negative control, the isolation of the furnaces receiving the transmitted vibration, was the only alternative.

It was decided to experiment with one furnace, mounting it in Korfund steel spring Isolators. Since the furnaces are from 20 to 30 ft. long, 8 or 10 ft. wide, up to 10 ft. high and weigh loaded from 150,000 to 200,000 lb., heavy duty isolators were needed. Satisfactory results achieved led the drop forging company to install spring isolators under the remaining 16 furnaces.



# ... Controlled Spheroidization

**T**HERE is a vast difference between the purposes governing the spheroidization of steel and those involved in the production of pearlitic malleable iron. Spheroidization of steel is practiced to facilitate machining and to improve cold working properties of the metal. If the pearlite in high carbon steel is in the lamellar form, cutting tools encounter microscopic-sized plates of hard iron carbide, relatively difficult to cut through. Tools are dulled and surface finish is rougher. When the carbides are drawn together into spheroidal form, there is less resistance to penetration of the tool by the surrounding soft ferrite and machineability is improved. The part is given a final heat treatment for the purpose of imparting desired hardness or other physical properties desired and the spheroids produced during annealing do not have a part in the final structure.

When high carbon or alloy steel is spheroidized to improve cold formability of the metal, the purpose is

• For corresponding data on bar steels, see "Spheroidizing Cycles Standardized," by H. L. Hopkins, *THE IRON AGE*, April 19, 1945, p. 72. See also "Short Cycle Malleabilization of White Iron," by E. E. Howe, *THE IRON AGE*, Jan. 18, 1945, p. 66.

to take advantage of ductility of the ferritic matrix. By imparting high ductility to the metal the piece will then stand much greater deformation without the danger of fracture that would exist if the carbide was in the form of lamellar pearlite.

In neither case does the metallurgist find it necessary to consider the combined carbon content of the

steel. Except for special steels, the silicon content is relatively low, and consequently, the amount of carbon existing as iron carbide is the same regardless of heat treatment. Also, there is little concern as to the size of the spheroids themselves. It is true, however, that if they are too tiny, machineability and ductility will be lower. Inasmuch as the final heat treatment eliminates the existence of these spheroids, their actual size will not affect the mechanical properties of the finished part.

None of this is true when pearlitic malleable irons are considered. These materials are produced in the form of castings and generally are used without further treatment after they leave the foundry, although they are adaptable to surface hardening and even hardening throughout. It is essential that the heat treatment given at the foundry be such that useful engineering properties are produced.

Because of this requirement, it is necessary that close control is put on

THIS type electric furnace is used to anneal malleable iron castings for spheroidization.



# Of Pearlitic Malleable Iron

By C. R. WIGGINS

Vice-President, Ferrous Metals Corp.,  
New York

the spheroidization. The irons used are much higher in carbon than is steel and during the heat treatment much of the carbon is changed to graphite in the form of temper carbon. If graphitization were 100 per cent, soft malleable iron would result. The mechanical properties such as hardness, strength and ductility will depend on the amount of combined carbon retained. Certainly, the same properties would not be found in a 0.90 per cent carbon steel as in a 0.10 per cent carbon steel. The same is true of pearlitic malleable irons. Controlled properties demand control of the combined carbon content.

## Influence of Particle Size

Also, as is well known in metallurgy, the sizes of particles have a pronounced influence on the physical properties of a metal. If high strength and low ductility are desired, the particles of hard constituent are produced in submicroscopic size. Conversely, if low strength and high ductility are needed, the heat treatment is so designed to produce coarse particles. Intermediate properties will call for intermediate size of particles. The sizes of spheroids of iron carbide in the same manner also pronouncedly influence the mechanical properties. Small spheroids result in higher strength with lower ductility and large spheroids have the opposite effect.

Because of the above consideration, the number and size of spheroids are important. The spheroid size and amount of combined carbon determine the number of spheroids. If controlled engineering properties are to be produced in a spheroidized pearlitic malleable iron, the size and number of spheroids must be under control. As an example of such control the manufacture of Z-Metal, a patented spheroidized pearlitic malleable iron, will be discussed.

The history of Z-Metal starts with the investigations of Dr. Anson Hayes and William R. Diedricks, beginning as early as 1915, made for the purpose of reducing the time cycle required for the graphitization of white iron. Later developments resulted in the evolution of controls enabling the operator not only to shorten the time

**... To correct what the author believes to be some misimpressions of the mechanism of short cycle malleabilization, the practice in the production of Z-Metal is reviewed. A spheroidization chart is presented that could well serve as a standard of spheroid particle size for other ferrous materials, such as steels.**

cycle but also to produce an iron containing definite amounts of combined carbon in the spheroidized form. Patents were obtained protecting the new developments.

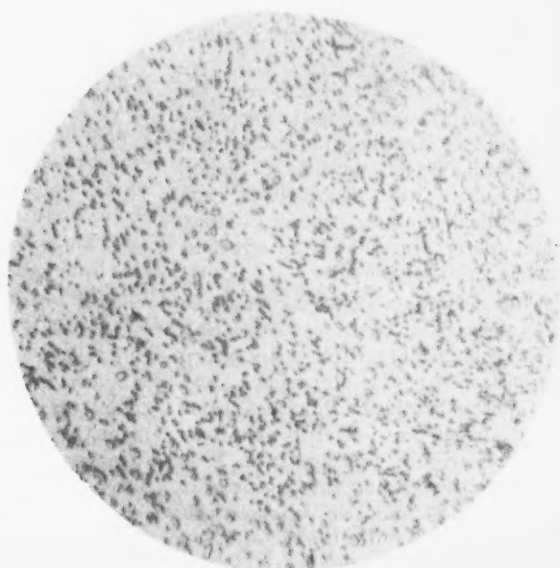
There are eight foundries producing Z-Metal. Melting is performed in the same manner as for malleable iron. Some plants use an air furnace, some use the duplex process—coupling a cupola with the air furnace—and some melt in electric furnaces. Close control is maintained on carbon, manganese and silicon contents. Total carbon is kept relatively low because too much temper carbon existing after heat treatment lowers the mechanical properties. Narrow limits exist within any individual foundry although the spread in carbon from the lowest to the highest ranges from 2.20 to 2.55 per cent. Silicon is the element used to promote graphitization and will range between 0.90 and 1.20 per cent, depending on the individual con-

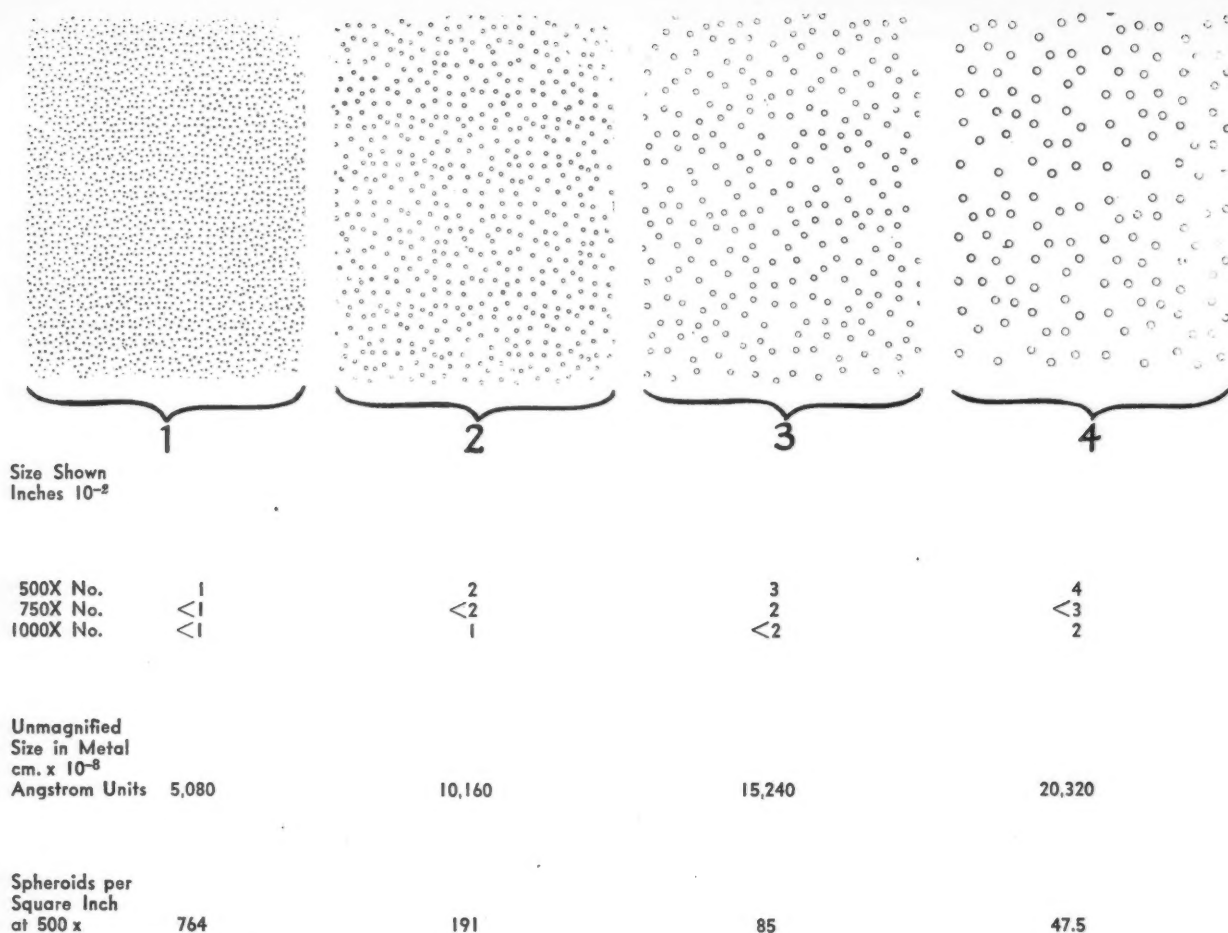
ditions existing within any one foundry.

## Manganese a Retardant

Without the use of a retardant alloy, graphitization might be complete on heat treatment, or it at least will not be under control. Therefore, in Z-Metal manganese is usually added to the molten metal as a retardant. Its use enables the metallurgist to positively control the amount of combined carbon. With a small addition of manganese, the amount of combined carbon will be very little, while considerable amounts will result in high combined carbon. The manganese content usually ranges between 0.70 and 1.00 per cent, depending on the properties desired. Combined carbon ranges from 0.30 to 0.60 per cent. The retardant is not needed during that part of the heat treatment above the critical temperature because austenite existing at

TYPICAL Z-Metal  
structure (Magnification 1000x).





NOTE: Chart based on 0.40 per cent combined carbon which gives number of spheroids as shown.

## Spheroidization

those temperatures retains carbon in solution so that only the excess may be graphitized. When subcritical temperatures occur, however, graphitization will continue to completeness, if time is permitted, unless a retardant is used.

As in the case of malleable iron, the castings are poured so that only white iron exists. Mottling, indicating lack of control, is not permitted. Many factors enter into this condition, such as chemical analysis, size of casting, metal temperatures and the effect of raw materials or heredity.

After cleaning, Z-Metal castings are given a heat treatment consisting of three steps: (1) High temperature graphitization; (2) air quench, and (3) spheroidization. Furnaces commonly used are electric elevator types ranging in capacity from 1 to 25 tons, although any furnace providing time and uniform temperature control which permits the three steps mentioned may be used.

### Heat-Treating Cycle

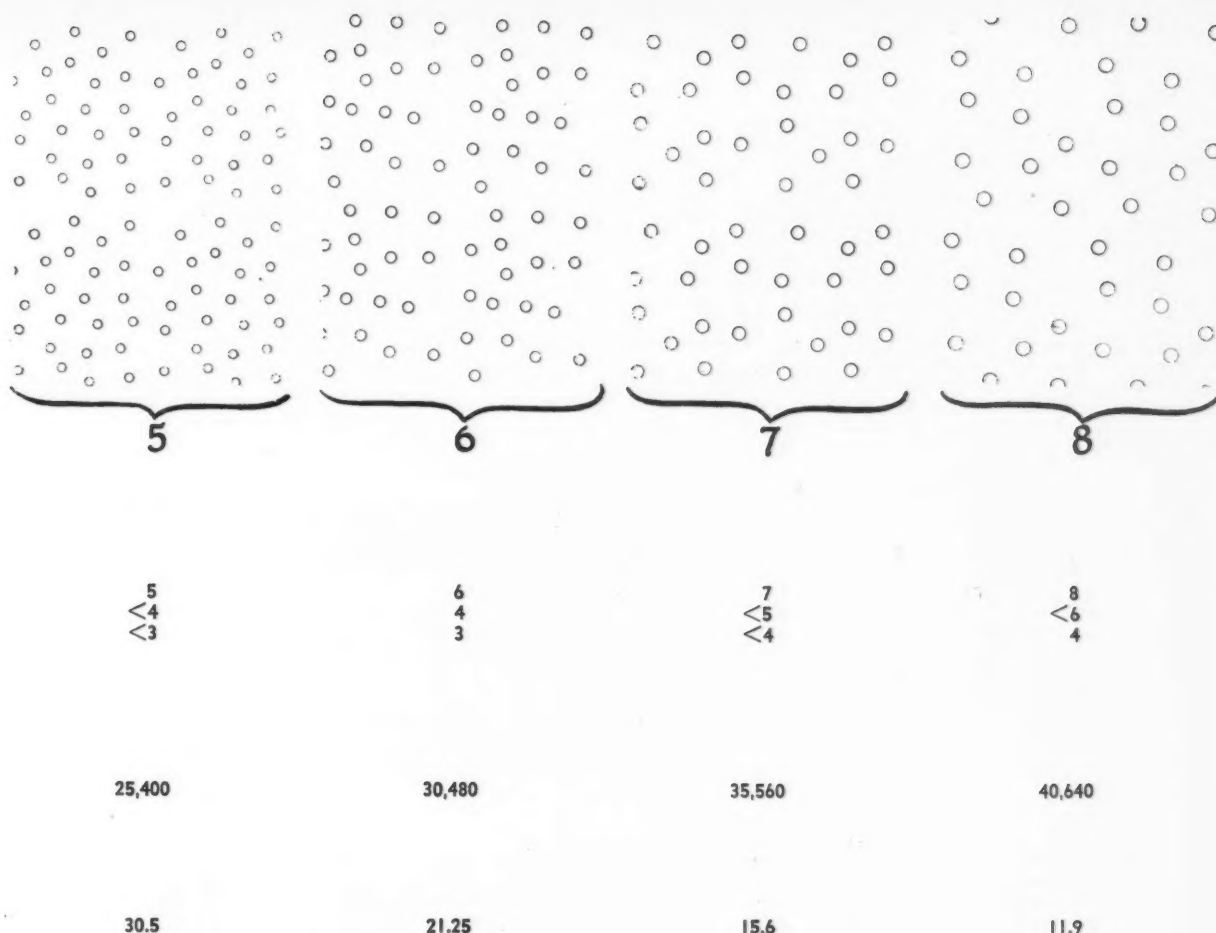
The Z-Metal castings are placed on the car floor, properly supported to prevent warpage and with enough air spaces to permit influx of heat during heating and outward flow of heat during the air quench. The car is elevated into the shell of the furnace and sealed in to prevent influx of air. The castings are heated to a temperature of 1720 deg. F. for periods ranging from 18 to 36 hr., depending on the analysis and plant conditions. During this time all the carbon not in solution in the austenite is converted to temper carbon. This involves solution, diffusion and precipitation.

When first stage graphitization is complete, the entire car is lowered from the furnace and air cooled until transformation of the austenite to fine pearlite occurs. This is at a temperature below 1250 deg. F. The car is once again raised, the furnace sealed, and the castings are reheated

to a temperature in the neighborhood of 1300 deg. F. for 30 to 36 hr. More carbide is converted to temper carbon, depending on the amount of retardant alloy used in the melting operation. The remaining iron carbide is also spheroidized. The size of spheroids depends on the quality of the air quench and the spheroidizing temperature. Low temperatures result in smaller spheroids while higher temperatures below the critical temperature give coarser spheroids. A chart has been prepared as illustrated to permit recording of and study of particle size. Most Z-Metal is produced with No. 1 or No. 2 sized spheroids. Size, shape and distribution of temper carbon nodules are studied and recorded.

Depending on the amount of retardant and other chemical analysis, tensile strength of Z-Metal is usually over 70,000 lb. per sq. in., yield strength over 50,000 lb. and elonga-





## Chart for Z-Metal

tion over 10.0 per cent. The combination of relatively high yield strength, good elongation and high machineability in a cast structure provides a highly useful engineering material. Endurance limit is 32,500 lb. per sq. in. and notches do not materially lower this figure. Brinell hardness ranges between 175 and 205.

Other alloying elements are sometimes used. Copper is added to improve corrosion resistance. It also

aids in the formation of a network structure. Molybdenum adds to strength, toughness and improves high temperature properties. Because of its physical properties, Z-Metal has achieved wide application in engineering circles. It is used in conveyor chain, gears, crankshafts, ordnance parts, heavy duty wrenches, machine parts, railroad car parts, truck housings, high pressure pipe unions and miscellaneous tools.

### References

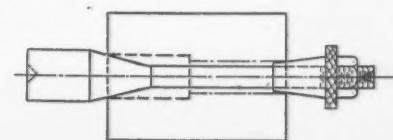
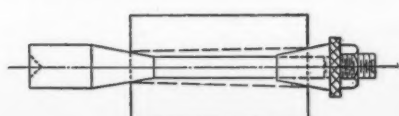
1. "The Commercial Market for Pearlitic Malleable Iron." Donald L. Boyes. Reports on Sponsored Fellowship Investigations in Industry, No. 1, 1941, Massachusetts Institute of Technology.
2. "Properties of Commercial Pearlitic Malleable Iron." Dr. C. H. Lorig, A.S.T.M. Bulletin, August 1940.
3. U. S. Patent 1,574,375; U. S. Patent 1,574,376; U. S. Patent 1,574,377; U. S. Patent 1,692,842; U. S. Patent 1,801,742; U. S. Patent 1,915,091; U. S. Patent 1,932,664; U. S. Patent 1,999,153; U. S. Patent 2,008,452; U. S. Patent 2,014,238; U. S. Patent 2,119,833.

## Opposed Taper Arbor For Accurate Grinding

**S**PECIAL arbors for grinding, where a high degree of accuracy is required with respect to runout on the ground surface, have been developed at General Electric's Pitts-

field works. They eliminate the necessity of having different arbors made to fit varied conditions since they may be used on parts with tapered holes or those having holes with two different diameters. The arbors are ground from hardened steel with centers in both ends. The part of the arbor which turns the work is tapered  $1\frac{1}{2}$  in. per ft., sufficient to grip the work

but not to bind in the hole. The removable tapered sleeve has the same taper and is a good fit on the straight shank of the arbor.





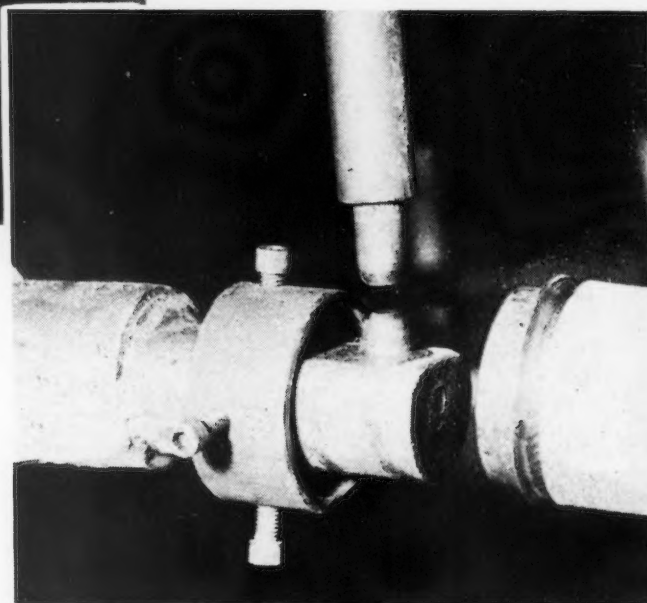
## Production Shorts

• • •

### LEFT

**C**UTTING stainless steel, short stack, exhaust manifold tubes to proper length has been a time consuming process involving scribing in the welding jig, band sawing to the scribed line, followed by grinding off the tube ends to close tolerance. Ruth G. Wilkinson has developed a jig to hold the manifold section in position while the ends are cut to tolerance by the band saw. This has eliminated the need for scribing the part in the welding jig and grinding down the edges after rough cutting.

• • •



### RIGHT

**E**XHAUST systems for aircraft engines require a fireseal ring in the stainless steel manifold tube. Assembly is by jig-tacking the ring in position and spotwelding it at the point of overlap between ring and tube. This is difficult because  $\frac{1}{4}$  in. spotwelds must be centered in an overlap only  $\frac{3}{8}$  in. in width. Frequently, edges of the overlap were welded, which required costly reworking. F. E. Dungan suggested a collar clamped over the electrode to locate the position of spotwelds. Tube and fireseal can be pressed tightly against it for spotwelding. The device has saved hundreds of manhours and a considerable quantity of material.

• • •

### RIGHT

**I**N stamping many deeply formed stainless steel exhaust manifold parts in drop hammers, several stagings are required in order to avoid cracking. By first building up the drop hammer die with pieces of rubber, stamping, and then stamping without rubber inserts the part is not formed too critically in any one blow. Paul A. Lane built up a staging in the die by pouring molten Kirksite into it in small patches and letting it cool rapidly until the entire die area has been covered. This Kirksite staging is more effective than rubber because all parts are supported properly during forming. Consequently more critical shapes can be produced at greater speeds. Also Kirksite can be taken out and used again without distortion.

• • •

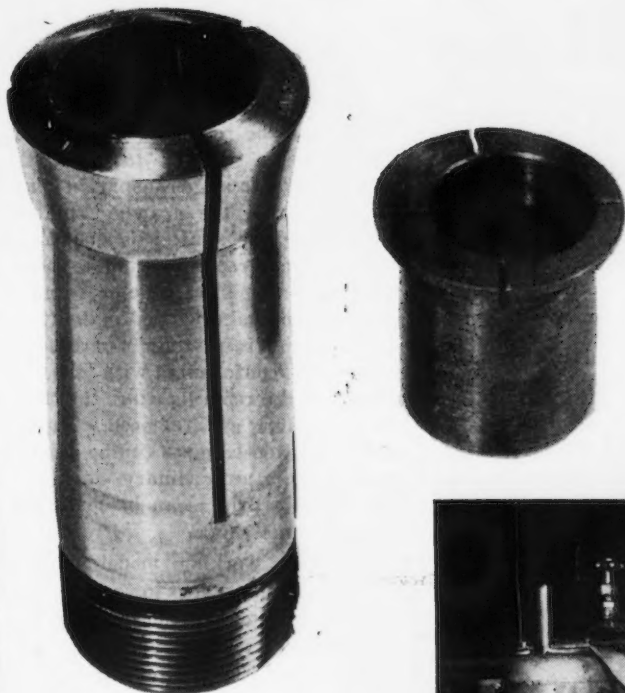
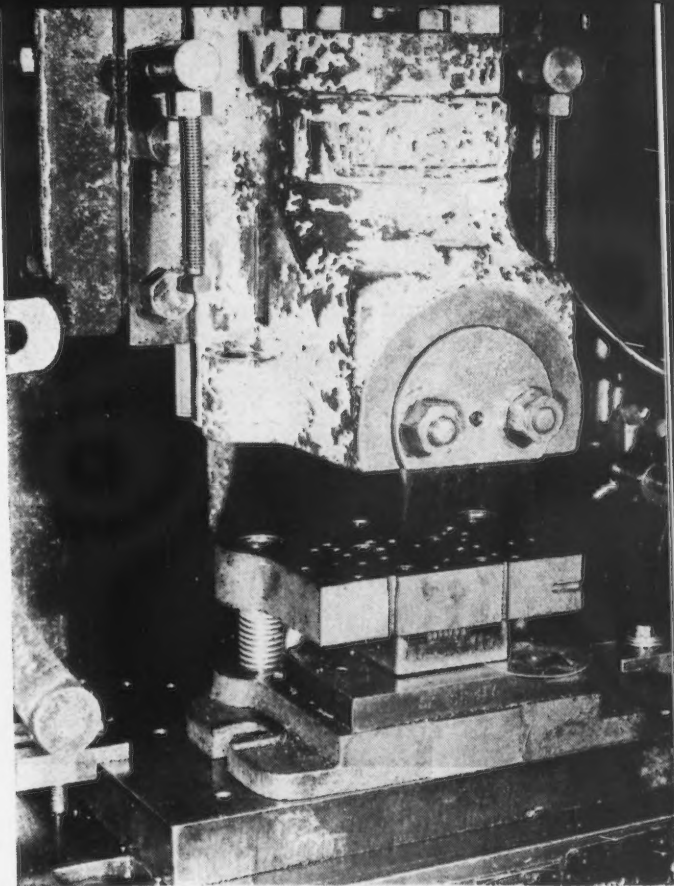


**C**UT at  
ply of  
reserv  
Under  
sary f  
reserv  
nel, al  
Wilda  
larger  
the r  
feeds  
and p

# At Ryan Aeronautical Co.

## RIGHT

MANY sheet metal parts must be cut by hand if manufactured in quantities too small to justify blanking dies. With the nibbling punch suggested by M. S. Clark, metal can be fed between punch and die by means of a template fastened to the punch. The self-contained die set, actuated by a punch press, shears metal to form the desired part. Spring action returns it to its former position. This has saved many manhours spent in handcutting parts for which blanking dies were not available.



## LEFT

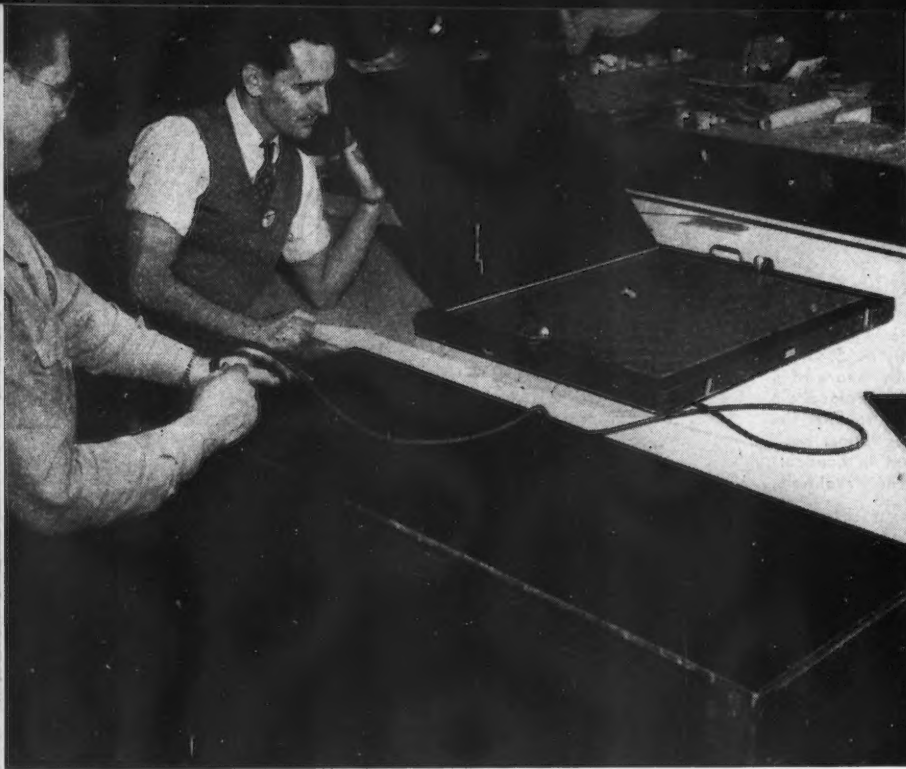
"JITTERBUG" shafts having an offset eccentric in the center section are used to actuate C-shears used in the Ryan plant. In order to turn this part down on a lathe, it was necessary to make several setups in a four-jawed chuck, and dial indicate the piece for proper offset. James J. DeVinney originated the idea of making off-center collets to hold the shaft in the lathe at just the right position to cut the eccentric. In this collet, in which the offset has already been established, the shaft can be cut very quickly after the collet has been centered in the lathe, and production of jitterbug shafts has been increased from 4 to 24 per 8 hr. day.

## RIGHT

CUTTERS of Porter routers are generally sprayed with a continuous supply of lubricating oil piped from a small reservoir located near the cutting tool. Under constant operation, it is necessary to stop the machine and fill this reservoir, by means of oil can and funnel, about 25 to 30 times a day. Harry Wildau suggested the installation of a larger tank to be located on the top of the router head, left. A metal pipe feeds the oil down into the spray system and permits uninterrupted operation for extended production runs.







# Producing

FIG. 1—Making an exposure with the portable reflex printing frame at the Consolidated Vultee Aircraft Corp. Small spot reproductions of changes on large master lines drawings are made with great saving of time over previous method requiring removal of entire drawing to template reproduction laboratory.

A PHOTOGRAPHIC device making possible the production of negatives of changes on drawings while on the draftsman's table, thus eliminating many of the delays that were previously considered necessary, has been developed for the engineering department of Consolidated Vultee Aircraft Corp., Downey, Calif. Thomas Miles and Frank Hewlett are the inventors of the portable reflex printing frame, which enables engineers to make small spot reproductions from larger master line drawings. Before the frame was developed, it was necessary to reproduce the

entire drawing with X-rays in the template reproduction laboratory; and this generally caused a considerable period of time to elapse before engineering information on changes could be released to the shops.\*

*\* For a description of the method of reproduction with X-rays, among others, see "Template Reproduction Methods," THE IRON AGE, May 4, 1944, p. 52.*

Essentially, the frame comprises a portable transparent vacuum "blanket" which carries a sensitized glass plate within a light-tight holder. When placed on a drawing board over

the area to be reproduced, an underside slide is removed to allow the sensitized plate and transparent blanket to contact the drawing surface. Then a topside shutter is opened to allow normal room lighting to penetrate an orange filter which covers the blanket and the sensitized plate (Fig. 1). After careful timing of the exposure in conformity with the intensity of the room lighting, the shutter and slide are replaced. Thereafter, the exposed plate can be quickly processed in an ordinary darkroom and suitable prints can be made for release to the shops.

The first working model of the frame was constructed to carry a sensitized plate with dimensions of not more than 18 x 24 in., because it was found that this size would accommodate at least 50 per cent of the current advance drawing changes. The transparent vacuum blanket was made from a sheet of  $\frac{1}{8}$  in. Plexiglas, stiffened and supported around the edges by a  $\frac{1}{4}$  x  $\frac{5}{8}$  in. strip of dural. A vacuum seal was attained by cementing a flanged rubber tube around the edge of the Plexiglas sheet. The vacuum helps seal the blanket to the drawing sheet (Fig. 2). The supporting frame was built up from hardwood and aluminum strips. Magnesium sheet, 0.032 in. thick, was used to fabricate the upper and lower light-tight covers.

The upper cover of the frame was hinged, so that it could function as a shutter, and the lower cover was made so that it could be inserted in the frame like the slide of a standard

FIG. 2—Frank Hewlett and Thomas Miles, inventors, show how the vacuum unit is connected to their new portable reflex printing frame. The vacuum helps seal the sensitized sheet to the drawing.



# Template Negatives

## On the Draftsman's Table

photographic film holder. The filter was an orange-dyed plate, similar to a Wratten No. 21 filter. Bolts at each end of the frame were situated so that an operator could raise and lower the vacuum blanket at will.

Consolidated Vultee uses a small wheeled truck to carry the printing frame with a suitable vacuum tank to and from the photographic laboratory. The detailed procedure in making reproductions is as follows:

(1) In the laboratory dark room the vacuum blanket is secured in the up position and the bottom slide is withdrawn so that an 18 x 24 in. sensitized glass plate can be fastened to the vacuum blanket by means of Scotch adhesive tape. Then the bottom slide is reinserted so as to seal the frame against any leakage of light, after which the loaded frame is placed in the above-mentioned truck.

(2) The vacuum tank in the truck (Fig. 3) is exhausted to approximately 20 in. of vacuum by the laboratory vacuum system.

(3) The area to be reproduced is carefully brushed clean, and the reflex printing frame is positioned thereupon. A strip of black velvet around the bottom edge of the frame provides a light-tight seal between the frame and the drawing surface.

(4) The dark slide is withdrawn and the vacuum blanket, with sensitized plate attached, is lowered until it rests on the drawing surface.

(5) A corner inlet tube is used to connect the frame with the vacuum tank (vacuum being applied so as to seal the blanket to the drawing surface).

(6) Exposure is accomplished by swinging open the shutter lid on top and allowing the normal fluorescent

room lighting to penetrate the filter, blanket and sensitized plate for about 20 sec.

(7) The shutter lid is then lowered, the vacuum shut off, vacuum blanket raised back to its normal position inside the frame, and the bottom slide replaced.

(8) Processing is accomplished in the laboratory darkroom with a litho type developer.

(9) Positive prints are made from the glass negative on metal for shop use.

The sensitized glass plates now being used by Consolidated Vultee are coated with a litho type negative paper by means of a standard glass adhesive. The paper is rolled on the glass about an hour after the plate is sprayed with adhesive. Good adhesion is assured by placing each of the plates under a vacuum blanket for a few minutes. Besides providing brilliant reflex negatives, the plates may be stripped and reused indefinitely. Details of the internal construction are shown in the cross-sectional drawing, Fig. 4.

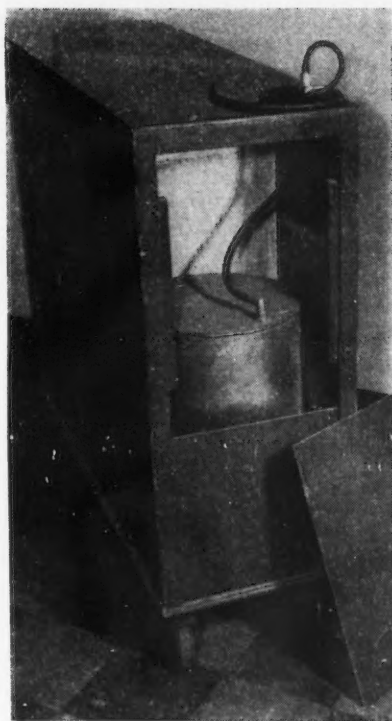
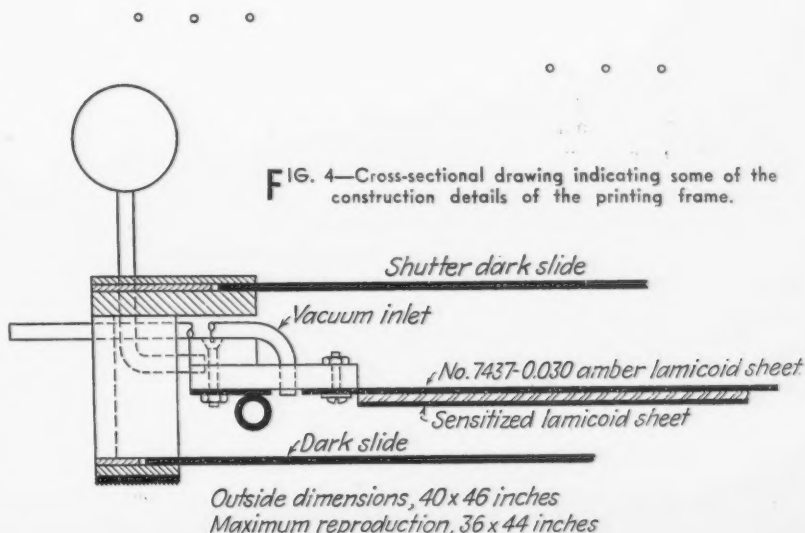


FIG. 3—View of the vacuum storage tank in the truck which is used to convey the printing frame from photographic laboratory.

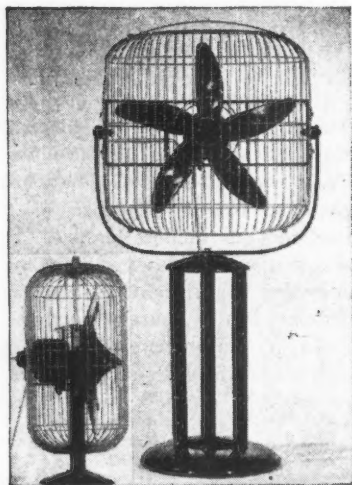


# New Equipment . . .

## Plant Service

. . . Recent developments in accessories for the metal working shop are described in the following pages.

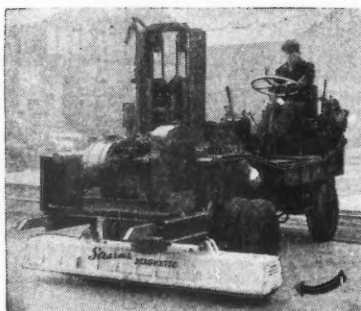
A 24-IN. five-blade, two-speed fan operated by fractional horsepower 110-volt, 60-cycle motor, the Roto-Beam Safety circulating fan has been announced by *Davis & Murphy*, 5252 Broadway, Chicago 40. Entirely enclosed by a guard it can be positioned 360 deg. on its horizontal axis and 360 deg. on its vertical axis. The fan and guard are 30 in.



wide and 18 in. deep and are furnished with floor standard to provide heights of 30 or 58 in. overall. The approximate circulation area is 75 x 100 ft. The fan is easily installed in any position on the floor, wall, ceiling, pillar and also on bench or in ducts, exhaust, intake and air radiator heaters.

### Road Sweeping Magnet

A ROAD sweeping magnet suspended below a skid frame or pallet on which is mounted a gas-engine-driven 220-volt electric power energizing unit that can be fitted to



any fork truck has been announced by *Stearns Magnetic Mfg. Co.*, 620 South 29th Street, Milwaukee 4. The pallet with the generating unit is picked up in the garage, driven outside to the magnet which is then attached with special hooks to go back of the generator set, the holding clamps are set and the road sweeping magnet is ready for work. A switch box back of the driver is designed to be clamped to the generator unit when the magnet is not in use.

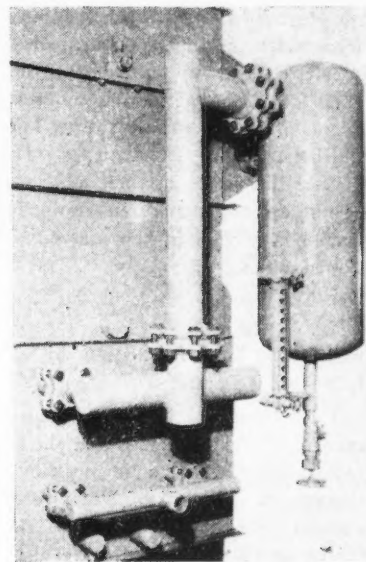
### Mechanical Packing

A LUBRALOY process mechanical packing has been announced by *Flexrock Co.*, 3628 Filbert Street, Philadelphia 4. It consists of an alloy structure of anti-friction metal which by a special process is impregnated with heat-resisting lubricants which cannot be driven off by heat or pressure and are emitted constantly. The packing is self-forming and molds itself easily to the size and shape of the stuffing box, creating a perfect seal, yet allowing rods or pistons to operate with a minimum of friction.

### Oil From Refrigerant Gas

A N improved method of removing oil from refrigerant gas has been developed by the *Niagara*

*Blower Co.*, 6 E. 45th Street, New York 17. The apparatus called the Niagara Oilout uses a cylindrical drum located at the outlet of the Duo-pass Aero condenser coil so that the refrigerant gas enters with a tangential motion. By reducing the temperature of the gas so that the oil vapor has become condensed, more oil is removed. Expansion of the system from a 4-in. pipe to a 14-in. drum re-



duces the velocity of the gas so that the oil is easily removed and held by the wall and separate plates of the trap. A sight gage and valve for draining the oil are provided.

### Air Cylinder

A DOUBLE acting, non-rotating air cylinder without tie rods has been announced by *Gerotor May Corp.*, Logansport, Ind. A keeper ring design provides leak-proof construction and permits the covers to be rotated to any position for convenient



## NEW EQUIPMENT

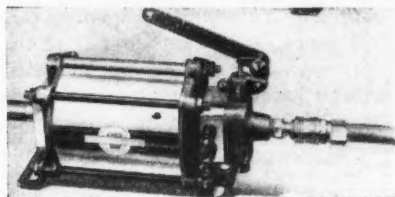
location of the pipe connections. Gerotor cylinders can be used for 150 lb. air and 300 lb. oil and water ser-



vice. Self-adjusting composition packings are used for the cups and piston rod. Features include large pipe connections, ample bronze rod guides and oversize alloy piston rods.

### Air Piston Motor

**T**HE BM-10 motor with twice the piston thrust force of the BM5 motor on a given air line pressure has been announced by *Bellows Co.*, Akron 10. The motors are small, compact, powerful air-driven reciprocating power units which operate on any air line pressure up to 175 lb. The valve and all operating controls are integral with the cylinder, permitting full and positive control over all operating phases at all times. One air connection is required which may be either with flexible air hose or rigid piping. Other features include independent speed control valves and a valve operating lever adjustable to "any angle in any plane" which is said to facilitate connection and syn-

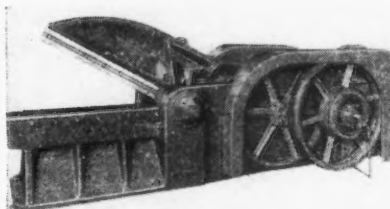


chronization with any reciprocating machine movement.

### Scrap Shears

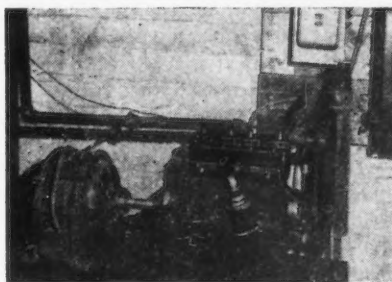
**A**N air-operated stop motion clutch on "Canton" alligator shears which is said to result in greater safety and more accurate cutting has been announced by *Hill Acme Co.*,

Canton Div., 6400 Breakwater Avenue, N. W., Cleveland 2. By tripping a hand or foot lever, the shear makes one cut and stops with the jaws open. Continuous jaw operation may be obtained by a simple instantaneous adjustment. This silent operating clutch which requires air pressures of only 70 lb. is said to eliminate practically all wearing parts except the clutch face. It can be installed on any shear in the complete Canton Alligator shear line.



### Compressor Head

**A** COMPRESSOR head, the Mogul compressor head, model 105, which will put scrap motor blocks to work has been announced by *Metalizing Co. of America*, 1330 Congress

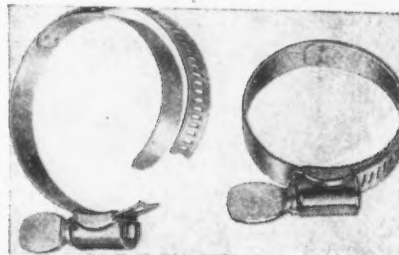


Street, Chicago 7. The head is designed to deliver a volume of 139 cu. ft. per min. with an actual delivery of 100 cu. ft. per min. at 100 p.s.i. The complete unit includes valve and water chambers, air intake manifold, air strainer, unloader, pilot valve and necessary parts for assembly.

### Hose Clamp

**A**N improved worm drive (Witte Type WWD) hose clamp which has an inner band of stainless steel which is said to protect the hose from the serrations in the outer band and distribute the load uniformly to provide greater strength and sealing power has been announced by *Witte Mfg. Co.*, Chicago 23. It is designed to take full advantage of the

superior physical properties of stainless steel. The hose clamp has com-



pact streamlined housing and hardened one-piece thumbscrew.

### Portable Desk

**A** PORTABLE desk, model No. 2131-15, for a multiplicity of industrial uses has been announced by *Lyon Metal Products, Inc.*, 111 Clark Street, Aurora, Ill. It stands on 3-in. swivel casters and has a positive brake attachment. The overall size of the unit is 34½ in. wide, 30 in. deep and 53 in. high. The desk hood provides adequate space for the storage of working papers and has a smooth 30-in. desk top with a 3-in. overall slope.

Other steel desks are also available and include the counter type model —(no legs), cabinet desk, desk high type, stationary type, and a model which fastens to the wall.



### Printing and Developing Machine

**A** PRINTING and developing machine for black and white prints in medium quantities, the model 41, has been announced by *Charles Bruning Co., Inc.*, 4754 Montrose Avenue, Chicago 41. The printer has a speed range up to 6 ft. per min. depending on the transparency of the original, printing either roll stock or cut sheets with a printing width of 46 in.

The light source is a 2000-watt mercury vapor lamp within a 6-in. diameter cylinder. A new method of



cooling pulls air into and through the cylinder and contact bends, resulting in minimum temperature.

#### Photo-Print Dryer

**I**MPROVEMENTS in the B-8 table-type continuous photo-print dryer have been announced by *Peck & Harvey Manufacturers*, 4327 Addison Street, Chicago 41. It dries matte or semi-matte prints or glossy prints as well as blue prints or black-and-white prints. Thermostatic control is available. Variable speed drive motors and controllers permit instantaneous speed changes over a range of 6 in. to 3½ ft. a minute. A chromium plated copper drum finishes photos with high glossy surface. Other features include specially woven seamless, band, no joints to deface prints, pressed steel framework that cannot warp from effect of heat, nichrome heaters, nickel contacts and asbestos insulated nickel wire used. Widths available are 26 and 44 in.

#### Protective Sleeves

**P**ROTECTIVE sleeves made of fabric coated with vinyl resin have been announced by *B. F. Goodrich Co.*, Akron. The sleeves are of lightweight, pliable material, black outside and olive drab inside, with length between 16 and 17 in. The sleeves are said to be particularly valuable for workers who need protection against oils, most acids and alkalis.

#### Neoprene Apron

**A**n improved design in neoprene aprons with a snap-on chrome leather front patch has been announced by *United States Safety Ser-*

*vice Co.*, 3615 Broadway, Kansas City, Mo. The apron is designed for use where heavy abrasive action is a factor in operations using cutting oils.

#### Fire Repellent Paint

**A** PAINT, called Fi-Repel, which is said to protect wood and other materials against fire hazard has been announced by *General Detroit Corp.*, 2270 E. Jefferson Avenue, Detroit 7, and *General Pacific Corp.*, 1800 S. Cooper Street, Los Angeles 21. It is shipped in concentrated paste form which after dilution can be applied with a brush or spray gun to the surface to be protected. One concentrated gallon, at standard dilution, will cover as much as 185 sq. ft. with two coats. The standard color is bone-white but tints may be added. It is endorsed by the Underwriters' Laboratories.

#### Cleansing Cream

**A** CLEANSING cream, Den-Nex, used for removing lacquer, paints and other materials from the hands has been announced by *Dennis Chemical Co.*, 2701 Papin, St. Louis 3. It is intended to replace masking creams. The cream is worked into the skin like soap until absorbent substances are loosened, then rinsed off with water.

#### Fountain Marking Pencil

**A** FOUNTAIN marking pencil, the Diagraph-Bradley speed marker, has been announced by *Diagraph-Bradley Stencil Machine Corp.*, St. Louis. It is said to be constantly saturated with ink because of a newly designed felt tip in which the ink penetrates from the inside out. The size of the pencil is approximately 7¼ in. long with a ½-in. diameter barrel. It is made of aluminum.

#### Acid Hood

**A**n acid hood which gives chemical workers protection against all concentrations of nitric, sulfuric, hydrochloric, acetic, hydrofluoric and carboic acids has been developed by *Chicago Eye Shield Co.*, 2300 Warren Blvd., Chicago 12. It is made of Cesco Acitex and covers the head, shoulders, chest and back. Features include splash-proof air feed units, side vents for better air circulation, built-in headgear and a light but durable frame.



#### Rotating Seal

**A** ROTATING seal called the Spring-life Gyro-Seal has been developed by *Cook Electric Co.*, 2700 Southport Avenue, Chicago 14. No auxiliary springs are required in its application because the inherent spring rate of Spring-life bellows is said to be in most cases, sufficient to maintain the required pressure, or the selling surfaces. The bellows can be made of all types of metals to suit the conditions of each applications. The seal will operate on both external and internal pressure, and has been built to withstand 5,000 lb. pressure p.s.i. in a range of from slower than 1 r.p.m. to faster than 4,000 r.p.m. Lapped finishes of the sealing members can be furnished to meet specifications where one light wave of flatness is required.

#### Hydrostatic Tester

**A** HYDROSTATIC tester for test tubes and cylinders of almost any size and shape has been announced by *Narragansett Machine Co.*, Providence, R. I. The tester is of the ram type and is motor operated through reduction gears with enclosed automatic switches. Testing is accomplished by introducing water at city pressure (normally 80 p.s.i.) into the cylinder under the test tube while the cylinder is held between two fabricated, specially designed steel adapter plates which seal both ends of the cylinder being tested. Hydrostatic pressure up to 6000 p.s.i. are produced by an air cylinder under the testing cylinder. The air cylinder piston extends up and through the bottom of the machine into the water filled cylinder or tube to be tested, causing controlled, measured displacement up to the hydrostatic pressure desired.



Giant rubber-pad Airplane press uses Oilgear Fluid Power for all motions. Tables travel up to 3 feet per second, yet accelerate and decelerate without jar. All functions together with selective sequence obtained simply with standard equipment. Tables can be brought under press as loaded. No waiting, no delay. Proved dependable trouble-free performance.



## AND STEP UP PRODUCTION

### Oilgear helps designers to get full press production capacity

Plane part plant after plane part plant is converting to these new Oilgear-powered 2½-, 3-, and 5-thousand-ton presses... selective or sequence loading and feeding on the 4-way shuttle tables are cutting down press non-productive time and boosting output tremendously. Oilgear's role is to provide the flexible, controllable power that makes such operations possible.

Sheet metal to be formed and dies are set up on table unsecured, the table accelerates smoothly so as not to disturb the set-up, travels as high as 3 feet per second, decelerates without jar under the rubber-pad press, and, after the forming operation, withdraws, its place taken by another loaded table. All operations are controlled automatically and remotely. Yet sequence can be varied at will to let tables feed under the press as fast as they are loaded, and all functions are obtained with simple, standard Oilgear equipment.

Flexible, versatile, adaptable Oilgear Fluid Power offers many other advantages too, all of them applicable to giant and midsize machines alike. Forward-looking builders and users of machines and processes cannot afford to overlook these advantages. Find out from Oilgear engineers what Oilgear can do for you. Write today... THE OILGEAR COMPANY, 1303 West Bruce Street, Milwaukee 4, Wisconsin.

#### ARE YOU TRYING TO:

1. Apply large forces through long... or short... strokes at variable speeds?
2. Obtain automatic work cycles, variable speeds in either direction... with or without pre-set time dwell?
3. Apply large forces through continuous or intermittent reciprocating cycles at constant or variable velocities?
4. Obtain extremely accurate control of either position or speed of a reciprocating member?
5. Apply accurately variable pressure either static or in motion?
6. Closely synchronize various motions, operations or functions?
7. Apply light... or heavy... forces at extremely high velocities through either long or short distances of travel?
8. Obtain continuous automatic reversing drives at constant R.P.M. or over a wide range of speed variation?
9. Obtain accurate remote control of speed and direction of rotation, rates of acceleration and/or deceleration?
10. Obtain constant horsepower output through all or part of a speed range?
11. Obtain automatic torque control?
12. Obtain accurately matched speed of various rotating elements?
13. Obtain constant speed output from a variable speed input?
14. Obtain full pre-set automatic control, elimination of problems of shock, vibration, etc.?

*You Need Oilgear!*

# OILGEAR

## Fluid Power



# Assembly Line . . .

STANLEY H. BRAMS

• **Reconversion plans progress well, turning attention to problems of labor relations . . . Jurisdictional disputes on changeover jobs, vet integration, shortened pay are problems.**



**D**ETROIT—The tumult and the shouting was dying down this week over reconversion. This increasing calm made it evident that with planning and authorizations largely settled between government and industry, makeready action is following in typically quiet fashion.

That being so, the item of major interest in the current news budget is the state of labor during the changeover. The War Production Board took note of this last week with a series of conferences held with officials of union locals and, lastly, with the international hierarchy of the CIO United Auto Workers Union.

All along the line there have been four topics of general discussion—jurisdictional problems, seniority rights, war veteran problems, and women workers. They interlace somewhat, but jurisdiction affairs and integration of veterans into factory jobs are the major problems, the latter by far the more important.

Jurisdiction arguments have bobbed up from time to time during the past several months and threaten to become more complicated as work proceeds on rebuilding of plants. The conflict is between the AFL Building Trades Council unions and the plant CIO maintenance men and rank-and-file workers. The disputes get down to something as indefinable as when an AFL carpenter putting up an addition to a plant shall turn over his work to a CIO maintenance man; or how far an AFL electrician shall bring in his lines to a machine which

is being set up by a CIO member; or whether—to anticipate a point—an AFL Teamsters Union man or a CIO rank-and-filer shall skid a machine—and be paid for it—from truck to craneway. Arguments like these have recently arisen, and in some cases have caused intermittent strikes. The fear is that employment during the forthcoming period will be down to the point that job rights will be even more jealously guarded than usual, and jurisdictional problems accentuated. To date there is no clear-cut solution.

The veterans' situation is still being threshed around. Some highly interesting figures underlining the extent of the problem have been developed recently here. In the auto industry a prewar employment of around 800,000 or so (700,000 men, 100,000 women) has risen to a wartime peak of about 1,300,000 (900,000 men, 400,000 women). In addition, these plants lost about 300,000 men to the services.

So today there are some 1,600,000 workers, 1,200,000 of them men, with seniority rights in the automotive plants, including body makers and suppliers—all those who have worked at one time or another on payrolls. If prewar employment is to be enlarged 25 per cent in postwar, it would provide jobs for no more than 1,000,000 or so. Even if the prewar proportion of women at work was reestablished (which is unlikely) there would be 300,000 or so men with seniority rights for which no jobs are available.

Beyond that, of course, there are the veterans who went to service directly from high school or college. In Wayne County alone there are some 19,000 such. As Selective Service now stands, the "super-seniority" of these boys is rather dubious, but at any rate they are at least a small factor in the picture.

**R**ESOLVING this down to plants, Briggs Mfg. Co. is a good example, and it has worked up some highly significant figures. These show that as of last November there were 30,586 persons on its seniority roles, 4385 of them veterans with seniority, 1010 with seniority of less than 90 days, but as of December, 1941, its total employment was but 14,123 persons. A forecast of 14,140 workers is anticipated for the limited production period expected later this year and in early 1946. So this company has 16,446 persons with seniority for which it will have no jobs.

Quite obviously, Briggs will be unable to hire for a number of years any veterans who never worked for the company. This company is one of those active in urging the general position of the auto industry today—that May 1, 1940, when Selective Service began, be considered a date after which seniority would accumulate for worker or serviceman alike, dating from the time he either went onto the job or into uniform. This would give veterans equal footing with war workers without previous plant time.

This kind of proposal makes a great

## Reconversion Underway

### Detroit

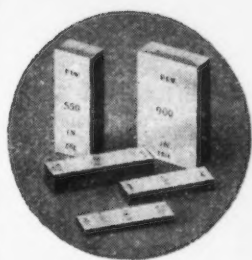
• • • More than 60 per cent of the automobile industry reconversion program has been approved by WPB and orders have been placed starting this work in progress.

The industry asked for \$50,000,000 in new machine tools. Up to the start of May, approvals had gone forward for approximately 64 per cent of this total—around \$32,000,000.

The construction budget of the industry was placed at \$35,000,000. To date approvals on this portion of the changeover

aggregate upwards of 65 per cent, equivalent to approximately \$23,000,000.

Tooling and equipment expense was estimated by the industry at about \$40,000,000. This figure includes new construction deemed necessary. Up to now the total stands around 55 per cent, or \$22,000,000. This laggard portion of the program will likely be stepped up shortly, as soon as screening is finished on the requests of one major industry factor. These requests appeared enough larger than others that they were held for special checking.

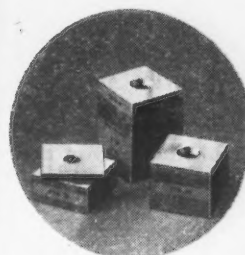


Typical Pratt & Whitney USA Blocks . . . rectangular . . . accurate to "millionths" . . . available in sets or singly.



This stack of P&W Hoke Precision Gage Blocks has a Tungsten Carbide Wear Block at the bottom and is about to acquire another on top. This is the ideal way to protect the "millionth" accuracy of Precision Gage Blocks.

Typical Pratt & Whitney Hoke Blocks . . . square shaped . . . accurate to "millionths" . . . available in sets or singly.



# Safeguard VITAL ACCURACY

## WITH TUNGSTEN CARBIDE WEAR BLOCKS

These wear blocks will greatly increase the useful life of your precision gage blocks. Made in two sizes — .050" and .100"—they are used on each end of a stack of blocks so they receive all contact with the surface plate or the work. They possess extremely long life . . . much longer than the blocks they protect . . . yet they are just as accurate. They are available in both Hoke and USA types . . . delivered from stock.

If you are not sure of your precision gage block accuracy after long use, avail yourself of Pratt & Whitney

inspection service. Regardless of make, we will report the exact condition of your blocks with any recommended replacements. With your blocks in first-class condition . . . and protected in use by Tungsten Carbide Wear Blocks—you are assured of long trouble-free service. Inspection service and new block delivery is approximately two weeks. Write for information.



# PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1, CONNECTICUT

deal more sense than the UAW "model clause" which provides only that a war veteran will get seniority equivalent to his time in uniform, but only after he has obtained a job. The clause does not tell how he will buck the staggering seniority list ahead of any job opening for him. Despite this notable omission, the UAW claims adherence to its platform from Packard, Hudson, Mack, and a number of rather important automotive suppliers.

To add emphasis to these problems is the developing state of veteran returns and cutbacks. Out of an estimated 250,000 who went to war from Wayne County, some 34,000 have already been discharged. Some of them have already found problems in the way of their getting jobs; a protest picket line of veterans formed the other day at the Lincoln plant in a dispute over hiring apparently caused by the inability of the company to get around its UAW contract proviso.

**O**PPORTUNITIES for these men and for workers themselves are diminishing by the day. Ford operations have all gone onto a 40-hr. week, permitted by WMC as a means of spreading work, and scattered other plants have made similar moves. Outright layoffs, too, continue to spread.

The trend of work schedules toward a 40-hr. basis was followed last week-end by a demand from R. J. Thomas, president of the UAW-CIO, that the War Labor Board reconsider its wage policies. Mr. Thomas, a WLB member, declared that schedule shortenings to the new level reduced take-home pay about \$10 a week for those now employed 45 hr. This is somewhat exaggerated, but approximately correct. It is conceded that average auto worker pay today is \$1.13 per hr., which would produce an envelope of \$45.20 for the shortened work-week, less old age benefit tax, income tax and war bond deductions, thereby netting the worker somewhere less than \$40, depending largely on the number of exemptions claimed for income tax purposes and for bond buying.

Mr. Thomas significantly claimed that "on previous occasions members of the NLB were in general agreement that the board's wage policies would require review on the occasion of VE-Day." More will be heard in Washington on this score in the none-too-distant future.

## Aluminum Joining Methods Summarized In Welding Report

### Detroit

• • • Three papers of broad interest comprised the technical program for the Second Annual Welding Conference sponsored by the Detroit Section of the American Welding Society May 4 at Rackham Memorial Building.

A summary of the various methods of joining aluminum, together with their applicability in specific cases, was offered by G. O. Hoglund, welding engineer, Aluminum Co. of America. The paper covered the complete range of welding processes.

Control of welding distortion was the subject treated by Charles H. Jennings of the Westinghouse Electric & Mfg. Co. research laboratory. He made the point that regardless of the help possible with fixtures and pre-forming, the best guarantee of standardized work was a definite welding procedure in the shop.

Outline of the necessary instruments for a well-equipped welding

laboratory was offered by R. T. Gillette, welding engineer of General Electric Co. The laboratory, he said, should be equipped for metallurgical, physical, chemical and photographic studies and testing; and should also be able to furnish data for production on preheating and postheating. This session was under the technical chairmanship of L. A. Danse, chairman of the General Motors metallurgical committee.

Following the Section's annual banquet, C. M. Ripley, power engineer of General Electric, spoke on the uses to which electricity has been put for war work, and on the broad range of employments for which electricity is suited and is being used.

The day's program was under the chairmanship of Edgar B. Brown of American Brass Co. New officers for the coming year, announced at the meeting, include: Chairman, George J. Friebe, Harnischfeger Corp.; vice-chairman, A. H. Lewis, Swift Electric Co.; second vice-chairman, A. J. Last, Welding Sales & Engineering Co.; secretary-treasurer, G. N. Sieger, S-M-S Corp.; and, assistant secretary-treasurer, Brown.

## Ford Says No Future Plans for Willow Run

### Detroit

• • • Ford Motor Co. has "no plans for the future use of Willow Run." That word came from Henry Ford II, executive vice-president, recently during ceremonies attendant on the award of an Army-Navy "E" to the giant B-24 bomber plant, which is now scheduled for shutdown by August.

This word apparently dispelled feeling that Ford might seek to purchase the plant under options held from the Defense Plant Corp. These feelings were rooted in statements some time ago by Henry Ford that the plant might find postwar use as a facility for manufacturing tractors and farm implements.

The younger Ford told workers assembled for the "E" ceremony that "we expect to be able to offer you jobs somewhere in the Detroit area just as soon as we receive the necessary go-ahead from the government."

At present about 15,000 persons are on the Willow Run payrolls, a sizeable reduction from the 21,000 employed less than a month ago when the first cutbacks leading up to August shutdown began.

The CIO United Auto Workers

Union, meanwhile, is pressing for a government decision to continue to utilize the plant for war work. Mass meetings have been held in recent weeks to urge such action, but thus far the Army Air Forces has shown no indication that it intends to use the facility after midsummer.

## Cutting Tool Plan Announced

### Detroit

• • • The Department of Justice and the Surplus War Property Administration have approved a plan of the Cutting Tool Manufacturers Association for clearance of surplus tools, and contracts have been drafted to carry out this program, it was announced this month by the association in letters to its members.

The plan follows the lines outlined earlier, under which manufacturers would act as agents for the Defense Plant Corp. in clearing out surpluses of usable equipment in orderly fashion.

Under contracts now being arranged between individual manufacturers and the DPC and RFC, each producer will take back on consignment any surpluses of his products as they develop. He will then sell these to the trade in a proportion of at least 25 per cent of each order. Payment will then be made to the government at normal trade discounts.



# WHAT ARE YOUR TOOLS and DIES DOING TO YOUR PRODUCTION COSTS?

Even in plants where everyone is satisfied with tool and die life, surprising improvements are made when the Carpenter job analysis plan is put to work. And the best part is that you can use it with very little extra effort and get—

- Better Heat Treating Results
- More Pieces Between Grinds
- Less Machine Down Time
- Lower Tool Costs
- Lower Production Costs



## THIS 3-STEP JOB ANALYSIS PLAN GIVES YOU BETTER TOOLS AND LOWER UNIT COSTS!

### 1. The Way to Match Tool Steel to the Job...

Suppose you are hunting for *greater toughness*, more wear resistance or greater *hardening accuracy* in a tool. With the Carpenter Matched Set Method you can eliminate guesswork. The nine tool steels shown on the Matched Set Diagram will solve 90% of the problems that come up in your tool room. With the diagram and the Carpenter *Matched Tool Steel Manual* you can actually predetermine tool performance on each job. The Manual contains an 80-page Tool Index and Steel Selector that quickly points to the best starting place when you have a tool to make. If you are responsible for tool production and costs, be sure to have a copy of this helpful Manual on your desk.

### 2. How to Get Better Hardening Results...

The second step in your analysis of each job is a check-up on heat treating methods. For proper heat treatment improves hardening results and reduces tooling costs. It also protects your tool design and steel selection recommendations.

The new Carpenter Heat Treating Guide can help you check your heat treating methods to get more from the tool steel

you use. It is a slide chart that quickly gives your heat treaters complete, accurate information. It also contains tips on quenching, furnace atmospheres, etc. This Guide is free to tool steel users in the U. S. A., so send for your copy.

### 3. And Now to Reduce Unit Costs...

Check on tool life and output per grind! Every time a tool setup is torn down, every time a tool has to be made over, costs shoot up. By using the Carpenter Matched Set Method and keeping a close check on the results—you bring down costs.

And for personal help with your tool steel job analysis program, call your Carpenter representative. He has the kind of experience that can help you answer the question: "What are my tools and dies doing to production costs?"

**THE CARPENTER STEEL COMPANY**  
121 W. BERN STREET • READING, PA.

**Carpenter**  
**MATCHED**  
**TOOL STEELS**

• 2,000,000 car break-even point to require 1,500,000 tons of steel in first production quarter . . . Tool outlook gloomy.



**W**ASHINGTON—The demand of the automobile industry for steel to permit operations at the 2,000,000-car break-even point has been set at 1,500,000 tons in the initial quarter when production is resumed.

The limitation orders controlling car and truck manufacture are expected to be among the last to be revoked by WPB because of the material needs of the industry.

WPB has promised all-out assistance in getting machine tools and other equipment necessary for auto industry reconversion, but gloomy predictions are that it will take five to six months for any considerable production of passenger cars to be obtained.

One reason for this is that tool companies are partly occupied with war work other than the making of tools and are only producing at a rate of about \$40,000,000 a month which includes domestic and lend-lease needs. Another reason is that the services have to date been unwilling to allow the auto industry to repossess its own tools now devoted to war work and substitute surplus government-owned tools.

\* \* \*

Never before has the need for concentrating on one agency, preferably WPB, the price and manpower authority as there is now in the readjustment period.

OPA's and WMC's postwar policy is in conflict with WPB's. WPB has announced that it is going to get rid of production controls as fast as pos-

sible so long as this does not produce conflict with war demands.

WMC says its job of controlling manpower for war needs will be complicated by WPB's open-ending of CMP and similar order removals and relaxations. WPB is countering with the argument that if it thinks it has acted to protect war production, WMC shouldn't worry.

WMC's stated policy is that it wants to continue the classification of labor areas—holding the classifications down to Group I and Group II areas with daily instead of monthly reclassifications. WMC wants to retain employment ceilings wherever imposed and to continue to grant plant priorities for manpower purposes.

WPB says that the retention of priorities is all right and so is even the employment ceiling feature to squeeze labor into places where it is needed. However, WMC's policy of refusing to issue certificates of availability for working men to go to non-military jobs in an area have resulted in workers going on the relief rolls in at least one place—Chicago. The same policy in Detroit has worked out to make workers refuse war jobs and apply for unemployment compensation.

The question of issuing daily advice on manpower area classifications is considered by WPB to be unduly restrictive and cumbersome in view of the fact that WPB believes that the release of employees by cutbacks will be ample to take care of both military and nonmilitary production needs. WPB points out that war jobs generally pay higher wages and pay overtime and consequently are the most attractive jobs.

OPA, on the other hand, burning with a religious fervor to keep postwar retail prices even with those in effect in 1942, says that the relaxation of WPB orders in the way it is planned will make "holding-the-line" impossible. OPA's claim for order relaxation will bring on uncontrolled competitive bidding up of prices for scarce materials and items.

OPA's silence on reconversion pricing has been significant of its disagreement with WPB's policy of relaxing controls, although any action it now takes can be considered as governed by its reconversion policies.

The fact that it has finally approved price increases for carbon steel products, more niggardly than it originally drafted, seems to mean that postwar reduced labor costs because of shortened working time are going to be a part of cost items now considered in connection with the raising of ceilings in the case of commodities as closely priced as steel. However, the steel industry was never asked to submit figures on this basis.

Too, since OPA is under the guns of Congress on both meat and steel policies perhaps the price agency hopes to postpone its announcement of reconversion pricing policies to prevent further adverse criticism.

The reconversion price policy has been formulated however and is now in the hands of Economic Stabilizer Davis.

Because the administration wants to minimize unemployment as much as possible it is possible that both WMC and OPA will eventually have to modify their thinking to the extent that their policies retard reconversion and re-employment of workers laid-off as a result of cutbacks.

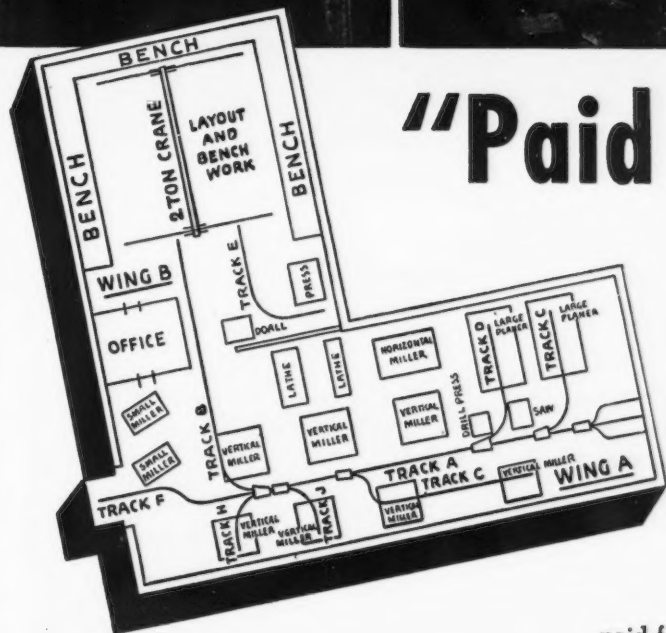
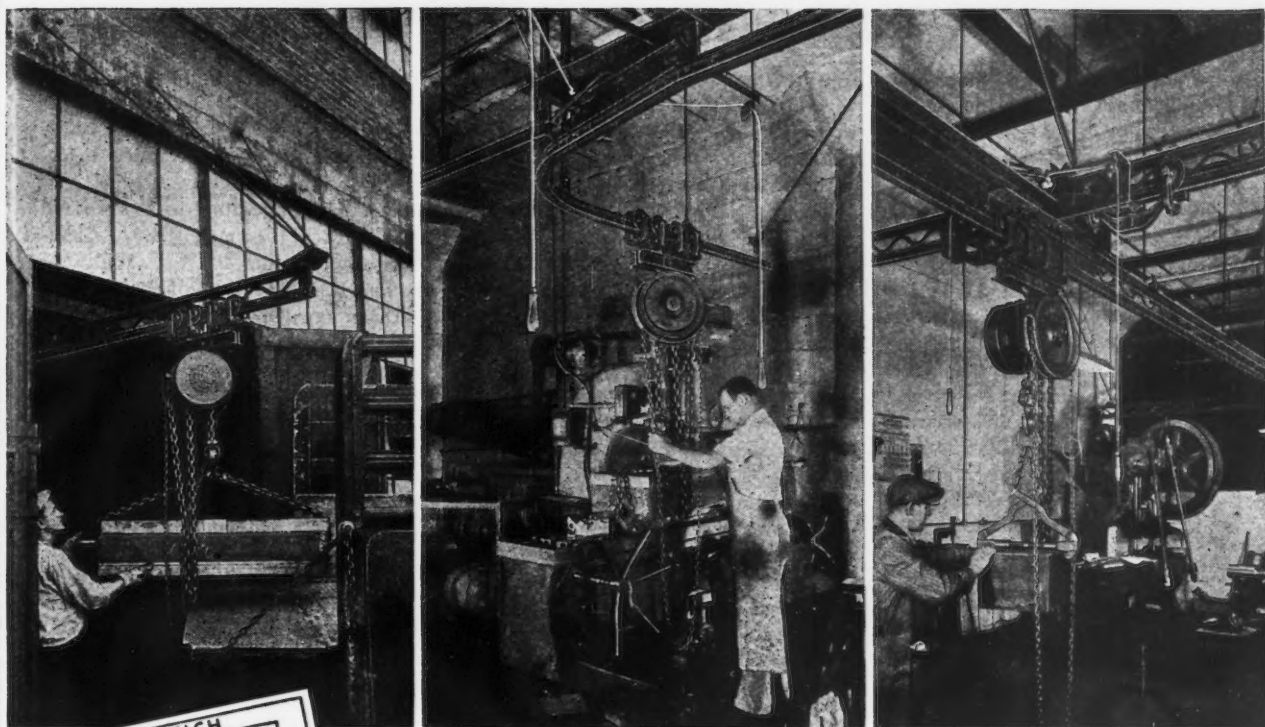
\* \* \*

Steel price revisions will probably not be put out by OPA until next week, since Economic Stabilizer Davis has delayed approval, although on May 2 he promised issuance of the new prices by May 5, to 25 senators and representatives and executives of 40 small steel companies.

\* \* \*

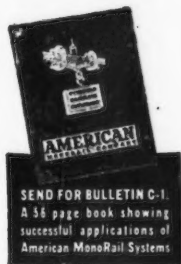
Portal to portal pay in bituminous coal mines, including steel-owned captive mines, was upheld by the Supreme Court in a 5 to 4 decision on May 7. The majority decision was delivered by Justice Frank Murphy, joined by Justices Hugo L. Black, William O. Douglas and Wiley Rutledge. A sharply dissenting opinion was delivered by Justice Robert H. Jackson, joined by Chief Justice Harlan F. Stone and Justices Owen J. Roberts and Felix Frankfurter. The decision gives legality to wartime portal to portal pay.

Passing on the case of the Jewell Ridge Corp., owner of two coal mines in Virginia, the majority opinion, reversing a lower court finding, based its precedent for portal to portal pay, as demanded by the United Mine Workers, its 1944 decision in the Ten-



**"Paid for Itself...**

*Time and Again..."*



An American MonoRail engineer will show you how to handle your products in less time and for less money.

"THIS system", says the owner, "has paid for itself time and again. Skilled die-sinkers and tool makers now work at their trade and spend little time lifting and straining to get blocks into the machines". Two ton die blocks in this small shop are handled overhead by American MonoRail. When this system was first installed it represented only a small part of the present track. Now, practically all manual handling has been entirely eliminated and every move from one machine to the other is done by American MonoRail.

**THE AMERICAN MONORAIL COMPANY**

13103 ATHENS AVE.

CLEVELAND 7, OHIO

THE IRON AGE, May 10, 1945—95



nessee Coal Co. Case in which the Court said that underground travel in iron ore mines in Alabama constituted work and hence was included in the compensable workweek within the meaning of the Wage Hour Act.

The minority opinion vigorously declared that the two cases differed "as night from day." It quoted the court's decision in the Iron Ore Case in which it was said that "there was substantial, if not conclusive evidence, prior to 1938 that the company recognized no independent labor unions and engaged in no bona fide collective bargaining with an eye to reaching agreements on the workweek." In the Jewell Ridge Case the minority decision that the majority finding either invalidates or ignores collective bargaining agreements "between miners and operators "based on half a century of custom in the industry."

### Publication Contains Methods for Treating Calcareous Red Ores

#### Washington

• • • The Bureau of Mines has just issued a publication describing what it calls two promising methods of concentrating the low-grade red iron ores of the Birmingham, Ala., district.

With a view to developing richer materials for the modern blast furnace of the Old South, the report says that although the methods have their limitations and cannot be considered "cure-alls," they have given encouraging results on a number of calcareous red ores. The publication may be obtained by writing to the bureau of Mines, Department of the Interior, Washington 25, D. C., for R. I. 3799, "Beneficiation of Iron Ores by Flotation. Part I—Anionic Flotation of Silica from Calcareous Red Iron Ores of the Birmingham District, Alabama."

Pilot plant and other tests conducted over several years with the two methods, the bureau said, "indicate that many of the calcareous red ores will yield marketable-grade concentrates with good recovery."

After pointing out that reserves of self-fluxing and high-lime ores are being depleted by the war, and the operators ultimately will face the necessity of treating lower-iron and higher-silica ores in the furnaces, the report says:

"Operating the furnaces with greatly increased slag burdens and reduced iron output is not economically attractive, even under the favorable conditions existing in the district, and the companies are becoming increasingly interested in the possibilities of bene-

ficiation to prepare higher-grade furnace feed."

First of several reports planned on this research study undertaken in cooperation with the University of Alabama, the publication was prepared by J. Bruce Clemmer, B. H. Clemmons, Carl Rampacek, M. F. Williams, Jr., and R. H. Stacy, all of the bureau's southern experiment station at Tuscaloosa. These technicians said the conventional flotation methods were found unsatisfactory in preliminary tests, leading to the extensive experimental work and the ultimate development of the two most promising methods involving "anionic flotation."

Match tests and continuous trials in a laboratory pilot plant were supplemented by similar trials at an experimental gravity concentrator operating in the Birmingham district.

### WLB Given Authority To Pass on Fringe Wage Adjustments

#### Washington

• • • Putting into effect a policy that he had urged as head of WLB but which was turned down by Fred M. Vinson, his predecessor, Economic Stabilizer William H. Davis recently issued a directive giving the board discretionary authority to pass on fringe wage adjustments.

The directive replaces an order issued by Mr. Vinson on March 8, which fixed rigid standards in such adjustments. The new directive sets definite firm ceilings on fringe adjustments in all wage cases and establishes in continuous industries shift differentials that were granted in the Little Steel case, 4c. an hr. for the second shift and 6c. an hr. for the third shift. Approval of the Director of Economic Stabilization is required "if there is reason to believe that the adjustments will cause an increase in price ceilings or production costs."

Exceptions are made in the case of non-continuous operations, and provide a 4c. an hr. differential for the second shift and 8c. an hr. for the third shift. Stabilizing limits for vacations were fixed at one week after one year of service and two weeks after five years' service.

These non-continuous industry differential adjustments may be approved if the board finds that the amounts follow an already established "clear and well-defined practice in the industry or the area and therefore would not be unstabilizing to the area or industry involved."

### THE BULL OF THE WOODS

BY J. R. WILLIAMS



---

# WHAT IS

## *"Plunge Forming" or Crush Dressing*

### OF GRINDING WHEELS?

---

#### ***Is Crush Dressing New?***

Yes and no—it is relatively new "over here" for general commercial use, but it has been standard practice in other countries for some time.

#### ***Who Introduced It Commercially to the U. S. A.?***

Knowing of this practice, representatives of the Sheffield Corporation, Dayton, Ohio, visited England in 1939 to investigate crush dressing. So impressed was Sheffield with the possibilities that patent and manufacturing rights were obtained for producing this equipment in America. A few weeks later an English concern placed an order with Sheffield for a large number of thread grinders especially designed for the crush method of wheel dressing.

#### ***What was the First Commercial Machine to be Produced in the U. S. A. Using Crushed Wheel Dressing?***

The Precision Thread and Form Grinder was designed, manufactured, and sold by The Sheffield Corporation of Dayton, builders of gage thread grinders for thread gage production since the first World War. This new machine tool is equally proficient in producing precision threads or forms (regular and irregular) from a crush dressed wheel.

#### ***What is Crush Dressing?***

Crush dressing is the process of using hardened steel rolls to form or dress grinding wheels to a wide variety of shapes which in turn can be transferred to the work part.

#### ***How is the Crusher Roll Produced?***

The same form that is to be crushed into the wheel is ground into a hardened steel roll approximately three inches in diameter by the use of the Sheffield Micro-

Form Grinder. The profile is reproduced directly from a drawing. A pantograph positions a microscope to guide the operator in feeding the grinding wheel into the steel roll to an accuracy of .0003".

Original crusher rolls for threaded parts are produced on the Sheffield Precision Thread and Form Grinder by using a single point wheel.

Many additional crusher rolls for either forms or threads can be reproduced quickly and at minimum cost by using crush dressed wheels on the Sheffield Thread and Form Grinder.

#### ***Can the Wheels of Surface Grinders be Crushed Dressed?***

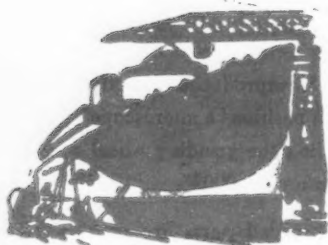
Yes, they can. At the same time the Sheffield Corporation pioneered the commercial use of crush dressing for producing circular forms and threads, it also pioneered the use of this method for dressing surface grinder wheels and the development of standard mountings for crusher rolls on surface grinders. Sheffield has unmatched research and commercial experience in crush dressing for surface grinding and has counselled with many plants making critical war materials on the solution of production problems by crush dressing.

#### ***Where Can More Detailed Information on Crush Dressing be Obtained?***

Full information on crush dressing, production of crusher rolls for surface grinders, the Precision Thread and Form Grinder especially developed for crush dressing, and the Micro-Form Grinder for producing crusher rolls, can be obtained from The Sheffield Corporation, Dayton 1, Ohio, U.S.A. Engineering data will be forwarded promptly.

ADVERTISEMENT OF THE SHEFFIELD CORPORATION

• As strings are cut and green lights flicker, smaller plants and processors are especially urged to order materials, with WPB assurance that tracks will soon be reasonably clear . .



**S**AN FRANCISCO—VE-Day actually occurred soon after April 15 in the procurement and civilian war agencies responsible for production. During the past two weeks long daily wires have come to WPB regional and district offices, cutting strings on L and M orders and flashing more green lights. Civilian manufacturers, fabricators and particularly smaller plants are actually being solicited to place orders and indicate requirements for conversion tools and materials for civilian production.

Apparently, before long, instead of a carefully balanced, all-inclusive CMP system, there will only remain highly rated MM (must military) orders and CC (compulsory civilian) requirements. Any mill or essential producer will fill these first and be free to do what he wishes with the balance of his production. There is every indication that smaller plants will be especially favored in conversion and resumption of production. Regional and specialized manufacturers of farm equipment, railroad supplies and other production commodities are actually being urged to place their orders for materials and these will probably take the CC rating for preference over bigger competitors in their same field.

Principal obstacle at present seems to be rigid OPA price regulations on finished civilian products. With war contracts terminated or completed, many manufacturers are unable to re-

sume civilian production and operate in the black when their products must sell on OPA base price, or roll back ceiling basis.

Plates, bars and structural shapes are now easy on the West Coast with late June or July delivery. It is generally expected that reinforcing bars will be readily available within the next 30 days in reasonably provident quantities. Sheets remain very tight and present orders do not rate delivery much earlier than the first of next year. Considerable odd-lot quantities of materials are and will be available in surplus stocks from tapering shipbuilding and terminated aircraft and ordnance contracts and from surplus military stocks. Some of these materials are moving steadily into warehouse inventories for current and immediate production.

**P**ROSPECT of an imminent 15 to 20 per cent increase in allotment of tin plate on the coast has faded in the last 30 days. Only the boldest dare mention WPB Order M81 in anything above a whisper. American and Continental Can companies were all ready to return to the manufacture of a considerable line of specialties for the oil, paint, varnish, beer and spice industries when the axe fell. Additional tinplate allotments were withdrawn for what is believed to be European consumption.

Normal tinplate tonnage in the coastal area is not in a much happier position. Regional heads of the two major can companies describe the condition as serious, although not yet critical. Relatively, compared to canning and packing districts in the Midwest and East, the coast is at a curious disadvantage. Where an agricultural district engaged in growing a perishable crop is situated within a day or two of a mill, or an adequate supply of cans, growers and canners can afford to sleep nights. On the coast where it takes six to nine weeks to get government approval of an emergency release of tinplate, the can companies can try to allay the fears of growers, when consulted as to probable conditions in the future. However, they maintain they can't really put their hearts in it when they estimate requirements, advise their customers accordingly, and then have their requirements cut 25 per cent for the second quarter.

Can companies have already had to turn down government orders for fear of jeopardizing the perishable packs due to ripen in August, September and October. Plate for these evanescent crops should already be in movement right now, and, they say, it is not. Furthermore, they state that they cannot gamble with a perishable crop. The armed forces come first and their requirements must be filled; next comes the matter of a possible national food scarcity; and third the economy of the West is too closely geared to agriculture to take any chances on juggling an already curtailed allotment in the fond hope of future relief.

With shipyard and aircraft employment declining, one would normally suppose that the labor situation should be clearing up, but the machine shops for the two firms are suffering from a lack of skilled mechanics, and already rumblings are being heard on California's perennially turbulent agricultural labor front with 45,000 cannery workers in northern California petitioning to strike under the terms of the Smith-Connolly Act. With the little steel formula already bent—if not broken—elsewhere in the country, few would be surprised to see a further increase in the gradually mounting cost of western living.

Continental and American both report diminished war contracts. Their machine shops have been active in war production as well as the food front. Continental's shops in Seattle have been working on Boeing sub-assemblies and in Los Angeles on Douglas parts as well as on incendiary bombs and tank steering mechanisms. Each have received recent cutbacks.

Aluminum research is understood to be at a virtual standstill with both firms. Neither company sees any prospect of a low enough cost in using aluminum for cans to sell them in anything like a competitive market.

The one really happy member of the can family is the West's brave little independent Pacific Can Co., which reports sales up to \$8,100,000 for 1944 compared to \$5,278,000 in 1943, the most successful year in the company's history.

While technically the steel warehousemen have a supply of tinplate on hand, the trade declares it to be more theoretical than actual as it is already spoken for. If they were lo-



# Accent

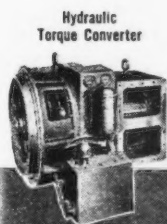
## ... ON EXPERIENCE

Outwardly sound... but is it? That's the boiler inspector's problem... his job to ferret out the hidden flaws which may cause catastrophe. No wonder that, here, *the accent is on experience!*

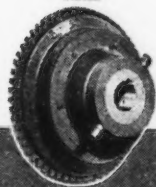
The same principle prevails in the manufacture of the vital connecting links between driving and driven units of powered equipment and machinery. Here, too, the accent is on experience.

That's why many leading manufacturers standardize on Twin Disc Clutches and Hydraulic Drives... place their reliance in the experience gained by Twin Disc in more than 26 years of manufacturing precision-built power links for all industry.

If you have a problem of power transmission or control, why not draw on the experience of Twin Disc engineers? Their recommendations—"friction or hydraulic"—will be unbiased... given without obligation. Write the TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



Hydraulic Torque Converter



Heavy Duty Clutch



Machine Tool Clutch



Tractor Clutch



Marine Gear

**SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918**

cated less than a month away from the mills or could establish a plate pool for emergency purposes for perishable crops, a great many heads would rest more easily at night as the canning season approaches.

**R**ECENTLY rejuvenated California Metal Trades Association has elected J. E. Holland, Pacific Electric Mfg. Corp., president; P. A. Hoyt, vice-president; George F. Bont, treasurer; and re-elected Max F. Lowe, secretary for the year 1945.

The organization represents some 250 metal manufacturing concerns in the San Francisco Bay area and is completing a fast survey to determine at what capacity its plants are operating and why.

Preliminary uncompiled results of the questionnaire show that rate of production in some of the shops has fallen as low as 20 per cent, especially those in the small shop category. Some large plants are faring better, ranging up to 90 per cent capacity.

Causes for the decline almost unanimously show a red vein running through the answers—the color being that of governmental tape. Specifically, the reasons cited are three: Manpower, material, and myriad regulations and restrictions.

Where a shop has or can obtain material, it can't get men; where one has men, it can't get material. One of the larger reporting members which can get both material and men can't get its manpower ceiling raised. Several state that if they can afford to wait two months for the necessary permissives, they have excellent chances of garnering some attractive civilian orders, but in the meantime they are losing men who have been with them for as long as 18 years and they may be broke first.

One firm which had been working on Navy contracts reports its production rate at 20 per cent. The owners say that the Navy will not allow them to accept new private contracts while the Navy is changing specifications and may want more of the plant's capacity, and that this condition has held for more than three months.

The association has found that reduction to a Number Two category was a Pyrrhic victory. They are getting no more business than while in the Number One designation, and the hope of continued maximum operation until VJ-Day was, to date at least, an illusion. In the meantime, the West's earnest effort to retain its manufacturing industries is lagging.

Henry Kaiser's name crops out in the aviation news again with report of an association with Dean Hammond, well-known aeronautical engineer to manufacture a twin-boom pusher type airplane. The predecessor of this plane was, it is understood, the late financially ill-fated Stearman-Hammond plane which was manufactured in the late thirties at San Francisco's Mills Field. The plane was the product of Hammond and Lloyd Stearman, who retired from the company before it went through the wringer. Hammond, long an exponent of the twin boom pusher and third wheel stayed on with the firm in an effort to get production costs below the \$4,500 sale price. Chief selling point for the plane at that time was the safety factor and the ease with which it could be piloted. All creditor rights to the plane are believed to have been wiped out in the Stearman-Hammond bankruptcy. Sole remaining possibility is in the design patents which are understood to have changed hands several times after the dissolution of the firm, and design patents are not considered to have a particularly strong right in equity.

The new Kaiser-Hammond plane is supposed to be the result of more than a year's experimental work by Hammond for the Kaiser interests and makes another possible addition—with

the Kaiser-Hiller helicopter—to western postwar aviation plans.

\* \* \*

Ford Motor Co. is reported to have purchased 12 acres immediately south of Seattle for construction of an \$800,000 warehouse and assembly plant to serve outlets in Washington, Idaho, Oregon and Alaska. The cost of the land, including a necessary fill, is reported at \$133,000. Construction of the plant will start as soon as restrictions permit. Ford's former Seattle assembly plant was purchased by the Federal Government at the start of the war.

## Another Dam Planned Across Columbia River To Cost \$100,000,000

### Seattle

• • • According to Col. Ralph A. Tudor, District Army engineer, as an immediate postwar employment project, plans are being rushed to completion for the construction of another huge dam across the Columbia River at the Umatilla site, to cost between \$75,000,000 and \$100,000,000. The proposed Umatilla power and navigation project is 196 highway miles east of Portland, and above Bonneville but well below Grand Coulee.

The primary purpose of this project is to improve navigation on the Columbia River and, incidentally, to develop from 630,000 kw. to 690,000 kw. of electric energy, the amount depending upon the height of the dam finally adopted. The Umatilla project is similar and supplemental to the existing Bonneville project, both in purpose and design.

It is estimated that the project can be completed in 4½ years under normal construction procedures and 3½ years under an accelerated schedule. The season in which construction is commenced has a very definite effect on the time of completion, as it is imperative that cofferdams and related diversion structures be installed during the low water period.

Plans are still in the infant stages, but Col. Tudor states the dam is high on the government list of post-war projects. There are also plans for making the Columbia navigable to Pasco, Washington, and the Snake River to Lewiston, Idaho. Engineering surveys have been authorized by Congress, but funds for construction and the necessary dredging has not been appropriated.

## Cited for Awards

• • • The following companies have received awards for outstanding war production:

### Army-Navy "E"

Westinghouse Electric & Mfg. Co., Industrial Electronics & X-Ray Divisions, Baltimore, Md. (fourth star), and Home Radio Division, Sunbury, Pa.  
Charles T. Brandt, Inc., Baltimore (fifth star)  
O. Hommel Co., Carnegie, Pa.  
Aircraftman Co., Inglewood, Calif.  
American Can Co., Ammunition Container Corp., Harvey, Ill.  
Borg-Warner Corp., Ingersoll Steel & Disc Division, Chicago.  
Deutsch & Sons Template Works, Milwaukee.  
Ednal Co., Peekskill, N. Y.  
Empire Stove Co., Belleville, Ill.  
General Motors Corporation, Fisher Body Div., Pontiac, Mich.  
Harding Machine Screw Co., East Liberty, Ohio.  
Kleystone Rubber Co., Inc., Warren, R. I.  
Merco Co., Los Angeles.  
Mid-States Shoe Co., Waterloo, Wis.  
Motor Parts Co., Philadelphia.  
Pilot Radio Corp., Long Island City, N. Y.  
Pinecastle Boat & Construction Co., Pinecastle & Titusville plants, Pinecastle, Fla.  
Rauland Corp., plants Nos. 1, 2, 3, and 4, Chicago.  
American Steel & Wire Co., Cuyahoga Works, Cleveland.  
Paul K. Weil Co., St. Louis.

### Maritime "M"

Lake Shore Engineering Co., Iron Mountain, Mich. (third star)

**CONSTANT FLOW RATE**

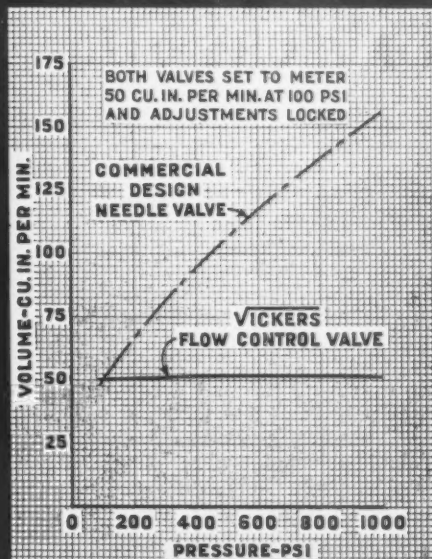
**REGARDLESS OF VARIATIONS**

**IN FLUID PRESSURE**

**Automatic  
Pressure  
Compensation**



**Adjustable  
Overload Pressure  
Protection**



All readings taken at constant temperature of 120° F. with oil having viscosity of 200 S.S.U. at 100° F.

## **VICKERS FLOW CONTROL AND OVERLOAD RELIEF VALVES**

In hydraulic control systems, this valve combines the functions of a flow control valve with an automatic relief valve to save space and simplify installation. It maintains a constant "metering-in" flow rate (for a given setting of the control adjustment) regardless of any variation in imposed fluid pressure resulting from changes in work resistance. Pump operates only at pressure required to do the work at hand; relief valve is independently adjustable and limits the maximum system pressure to any desired value.

This valve combines in one unit the means for accomplishing three independent functions: (1) adjustable control of flow rate in the hydraulic circuit, (2) adjustable overload pressure protection in the hydraulic system, and (3) remote "Start and Stop" control when used with suitable pilot valve. See Bulletin 40-22 for complete information. Vickers Application Engineers will gladly discuss with you how "hydraulics" can be used to your advantage.

**VICKERS Incorporated**

**1420 OAKMAN BLVD. • DETROIT 32, MICHIGAN**

Application Engineering Offices: CHICAGO • CINCINNATI • CLEVELAND • DETROIT • LOS ANGELES • NEWARK • PHILADELPHIA • ROCHESTER • ROCKFORD • TULSA • WORCESTER

**Representative of More than 5,000 Standardized Vickers Units  
for Every Hydraulic Power and Control Function**



**CONSTANT DELIVERY  
PUMPS**



**FLUID  
MOTORS**



**DIRECTIONAL  
CONTROLS**



**VOLUME  
CONTROLS**



**PRESSURE  
CONTROLS**



**CONTROL  
ASSEMBLIES**



**VARIABLE DELIVERY  
PUMPS**



# PERSONALS

• • •

• **William D. Truesdale** has been elected vice-president in charge of finance and **Russell L. Peters**, formerly assistant treasurer, has been elected treasurer, Inland Steel Co., Chicago. **E. A. Horne** has been appointed assistant to the treasurer. Mr. Truesdale started with the company in 1907 as general auditor and subsequently was elected treasurer and secretary.

• **E. J. McPhee**, previously general superintendent of the truck plant, Dodge Bros. Corp., Detroit, has been made plant manager, succeeding **Russell H. Dragsdorf**.

• **John S. King** has been named manager of the pump division, Fairbanks, Morse & Co., Chicago. Prior to his recent appointment, Mr. King was manager of the firm's New Orleans branch.

• **Pearson E. Neaman** has been elected a vice-president of Freeport Sulphur Co., New York, and its subsidiaries, including Cuban-American Manganese Corp. and Nicaro Nickel Co.

• **M. C. Pecsok**, former sales manager of the brush division, The Osborn Mfg. Co., Cleveland, has been elected vice-president.

**M. C. PECSOK**, vice-president, The Osborn Mfg. Co.



• **George Spatta** has been elected president of Clark Equipment Co., Buchanan, Mich., and **John M. Mack**, vice-president and director. **Dr. Leo Wolman** has been elected to the board of directors, and **John M. Clark** has been elected to the executive committee.

• **C. T. Burg**, formerly general sales manager, has been elected vice-president in charge of sales, Iron Fireman Mfg. Co., Cleveland. **Frank S. Hecox** has become vice-president and treasurer, with headquarters at the company's main plant in Portland, Ore. **Clifford W. Snide** has been named secretary and **Omar C. Spencer** a director and assistant secretary.

• **J. J. Huether** has been named assistant manager of the Industrial Divisions, General Electric Co., Schenectady, N. Y., and **W. A. Wirene**, manager of the Industrial Materials Division. Mr. Huether had been manager of the Industrial Materials Division for eight years, with Mr. Wirene as assistant manager since 1942.

• **Earl W. Pierce**, formerly assistant to the general superintendent, South Chicago plant, Carnegie-Illinois Steel Corp., has been appointed chief metallurgist. **Tom J. Peters**, previously assistant superintendent of the maintenance division, succeeds Mr. Pierce.

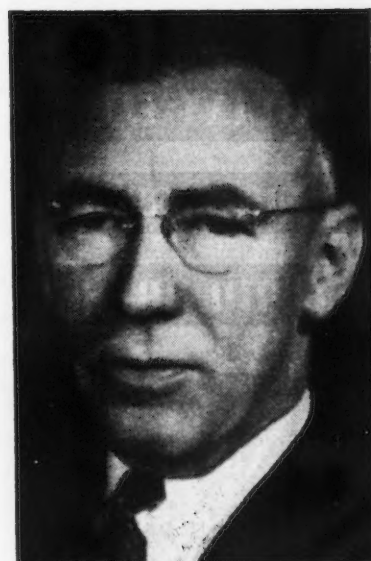
• **Lt. Col. Philip G. Murphy** has been elected president of the Stimpson Computing Scale Co., Louisville.

• **William J. Wardell**, vice-president and comptroller of American Can Co., New York, has been elected a director of the company.

• **John W. Stoutenburg** has been appointed Detroit district sales manager for Follansbee Steel Corp., Pittsburgh.

• **A. P. Shacklock**, formerly acting factory manager of the Oakland plant, has been appointed plant manager of Warwood No. 21, Continental Can Co., New York, succeeding **H. L. Humphrey**, resigned. **L. V. Hare** has been appointed assistant plant manager of plant No. 16, Baltimore, following the resignation of **J. Coyle**, Jr.

• **Maj. Charles M. Beeghly** has reverted to inactive status and resumed his former duties as sales manager of the Cold Metal Products Co., Youngstown, Ohio.



**ERNEST C. LOW**, vice-president in charge of sales, John A. Roebling's Sons Co.

• **Ernst C. Low** has been elected vice-president in charge of sales, John A. Roebling's Sons Co., Trenton, N. J.

**John D. Thompson** has been named vice-president in charge of production and **Charles M. Jones**, vice-president in charge of engineering. **Archibald W. Brown**, treasurer, connected with the company since 1902, has been elected a member of the board of directors.

• **Norman I. Stotz** has been appointed vice-president in charge of sales, Braeburn Alloy Steel Corp., Braeburn, Pa.

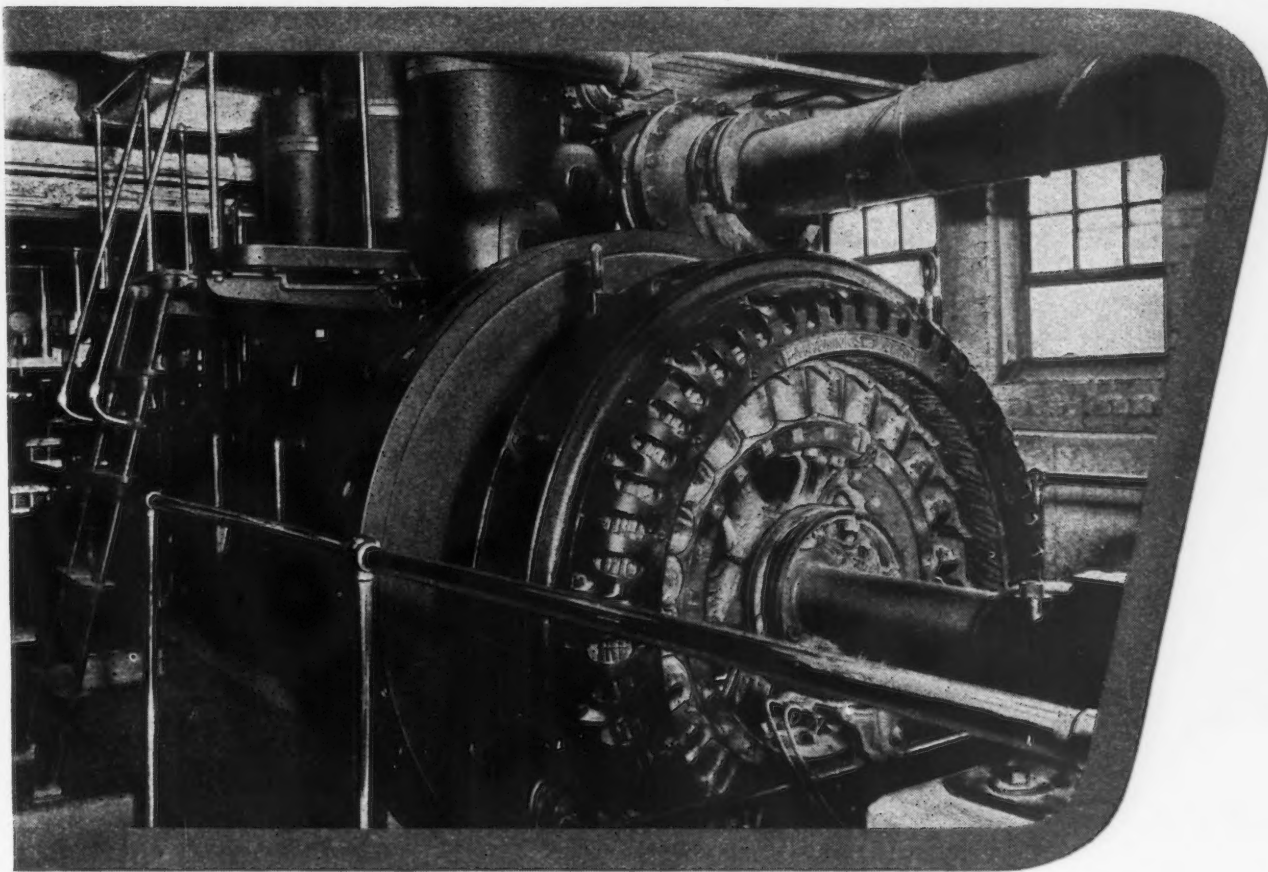
• **John A. Goundrey**, formerly production manager of the tank division, Federal Machine & Welder Co., has been appointed works manager of the Diamond Iron Works, Inc., and Mahr Mfg. Co., Minneapolis.

• **John C. Harrower** has been elected vice-president of Air Associates, Inc., Teterboro, N. J., in charge of sales and engineering. Mr. Harrower previously was sales manager for the Eclipse Aviation Division of Bendix Aviation Corp.

• **George E. McLaughlin**, formerly with the War Production Board in Philadelphia, has joined the New York office of Luria Bros. & Co., Reading, Pa.

• **Robert Sergeson** has been named chief metallurgical engineer of Rotary Electric Steel Co., Detroit, succeeding **L. L. Ferrall**, resigned.

# Power Costs Drop *80%* at Plating Plant



*One of the two Fairbanks-Morse Diesels in operation at the Grand Rapids Plating Co.*

By installing two Fairbanks-Morse Diesels, the Grand Rapids Plating Co. reduced its cost of power from \$50 to \$10 a day. The \$10 includes fuel, lubrication, and operation and maintenance costs. This record was established in 20,000 hours of sustained service.

This means the Fairbanks-Morse Diesels have saved enough to pay for themselves. And, such dependable, low-cost power is available for your needs, too. Write Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.

BUY MORE WAR BONDS

## Fairbanks-Morse

*A name worth remembering*



Diesel Locomotives • Diesel Engines • Generators • Motors • Pumps • Scales  
Magnetos • Stokers • Railroad Motor Cars and Standpipes • Farm Equipment



**J. O. H. ANDERSON and H. B. SPACKMAN**, assistant general managers of sales, Jones & Laughlin Steel Corp., as announced in the May 3 issue of *THE IRON AGE*, p. 84.

• **A. C. Bekaert** has been appointed comptroller of the Wickwire Spencer Steel Co., New York, and subsidiaries. Mr. Bekaert has been associated with Wickwire Spencer since 1943 as assistant treasurer.

• **Lorin L. Ferral** has been named metallurgical director of the Crucible Steel Co. of America, Pittsburgh.

• **J. A. Holladay**, recently elected vice-president of U. S. Vanadium Corp., New York, has assumed charge of the newly formed Metal Chemicals Division.

• **William F. Kennedy** has joined the International Nickel Co., Inc., New York, in the capacity of general solicitor and assistant secretary.

• **Carl L. Zak** has been made assistant general manager of sales, Pittsburgh Steel Co., Pittsburgh. Mr. Zak previously was manager of tubular sales. E. R. Smith has been named manager, oil country tubular sales.

• **Charles C. Jarchow** has been elected a member of the board of directors, General Steel Castings Corp., Eddy-stone, Pa.

• **Albert L. Taylor** has been appointed Canadian sales manager of the Weatherhead Co., Ltd., St. Thomas, Ont.

• **Dr. Charles A. Thomas**, former director of the Monsanto Chemical Co., Central Research Laboratories, at Dayton, Ohio, has been elected vice-president, and effective September 1 will become a member of the company's executive committee. Dr. Thomas is succeeded at Dayton by **Dr. Carroll A. Hochwalt**, formerly associate director of the research laboratories.

• **George G. Main** has been elected assistant treasurer and assistant secretary of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Main has been connected with Westinghouse since 1926.

• **R. C. Geekie**, formerly assistant to the president in charge of sales, Scullin Steel Co., St. Louis, has been elected vice-president in charge of sales. **B. L. Norton** has been appointed assistant vice-president; **F. H. Spenner**, assistant vice-president in charge of engineering, and **W. H. Coburn**, assistant comptroller.

• **Lucien W. Moore** has been appointed general manager of sales and branch houses, Crane Co., Chicago, succeeding **J. A. Dwyer**. **F. J. Wilkey** has been appointed manager of the valve and fitting department, the position occupied by Mr. Moore until his recent assignment in France by the War Department.

• **Jesse L. Powers** has been named superintendent of the engine plant, Buick Motor Co., Flint, Mich.

• **Charles S. Northen, Jr.**, has joined the staff of Sloss Sheffield Steel & Iron Co., Birmingham, Ala., as sales manager.

## OBITUARY...

• **Edward G. Weed**, executive vice-president of the Pyrene Mfg. Co., Newark, N. J., died suddenly April 23 at Toronto, Ontario. Mr. Weed had been president of the Pyrene Mfg. Co. of Canada, Ltd. since 1923, becoming vice-president of the Newark outfit in 1929.

• **Frederick Poth**, 51, a foreman in the blast furnace department of the Lackawanna plant, Bethlehem Steel Co., died April 27.

• **Charles W. Shartle**, 53, vice-president and sales manager of the Texas Electric Steel Casting Co., Houston, died April 25.

• **L. B. Ross**, 45, president of the Eclipse Lawn Mower Co., Prophetstown, Ill., died April 30.

• **Robert C. Post**, president of Post & McCord, New York, died suddenly May 2 at the age of 67.

• **William R. Webster**, chairman of the board of the Bridgeport Brass Co., Bridgeport, Conn., since 1930, died April 28 at the age of 77. Mr. Webster had been connected with the company for 48 years, serving successively as department superintendent, general superintendent and vice-president.

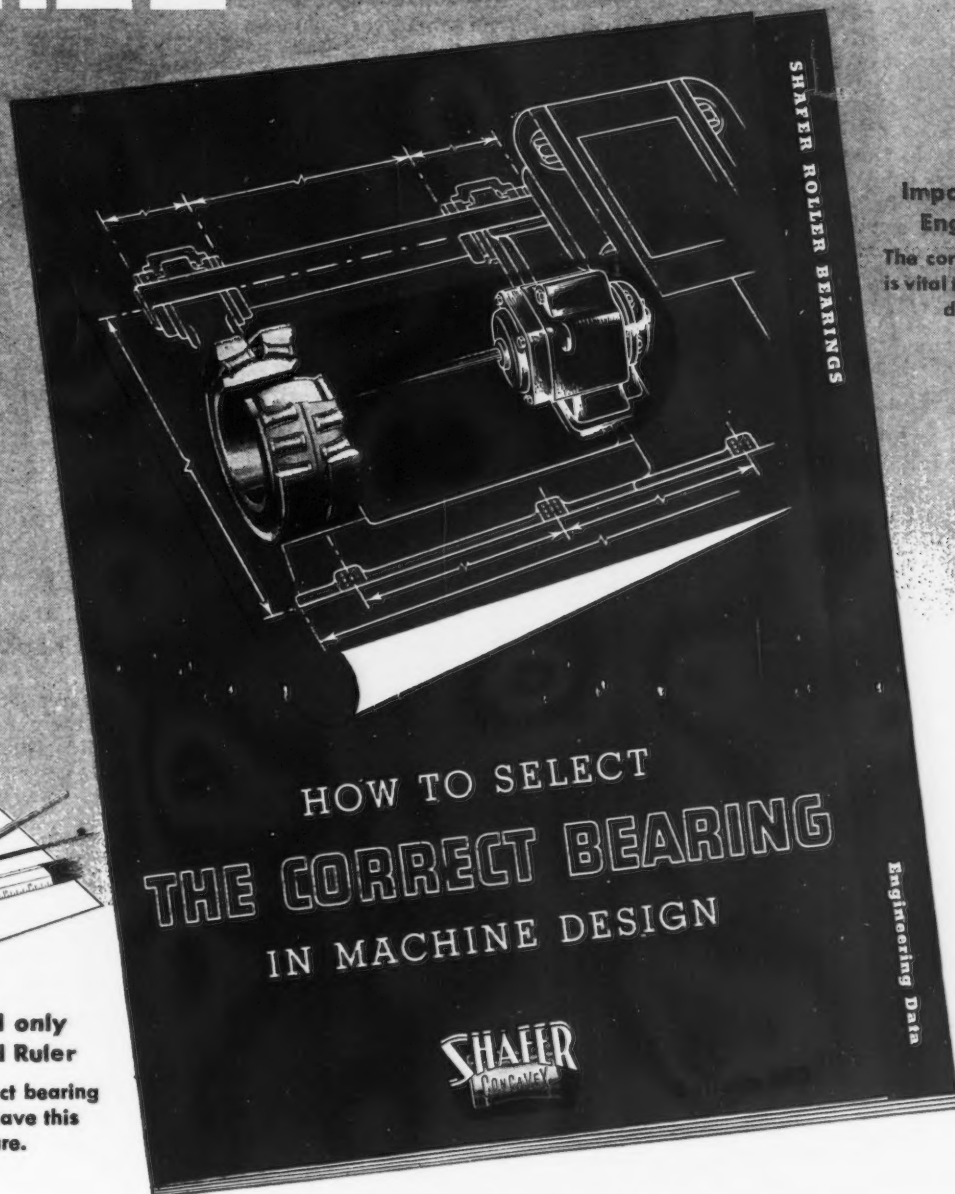
• **Charles H. Thomas**, 60, president of Canedy-Otto Mfg. Co., Chicago Heights, Ill., died April 29.

• **James Fentress**, 74, founder and honorary chairman of the Chicago Metal Hose Corp., Maywood, Ill., died April 29 at Sarasota, Fla.

• **Rollin C. Shurmer**, sales manager, Lake City Malleable Co., Cleveland, died April 28. Mr. Shurmer had been associated with the company for 35 years.



# FREE to Engineers and Machine Designers!



**Important to  
Engineers**  
The correct bearing  
is vital to successful  
design.

**You need only  
Pencil and Ruler**  
to select correct bearing  
when you have this  
brochure.

**NEW 6-PAGE BROCHURE** presenting a simplified  
*method of determining and selecting the proper bearing for your needs.*

No more digging through a lot of data. No more mathematical calculations. No guess work. A new brochure, just published, ends all that. "How to Select the Correct Bearing in Machine Design" presents a new easy way to determine the bearing you need for desired load and operating conditions. When you know r.p.m., minimum life and design load, you need



only a pencil and a ruler to pick out immediately the correct bearing. Clear instructions that are easy to follow show you exactly how to use the selection charts. A copy of this 6-page brochure, measuring 9 x 12 to fit your files, with tab for identification, will be sent to you free on request. Write today for Bulletin No. 652. Edition is limited.

## SHAFFER BEARING CORPORATION

1422 WEST WASHINGTON STREET • CHICAGO 7, ILLINOIS

# Dear Editor:

## BABBITTING BEARINGS

Sir:

In *THE IRON AGE* of March 29, we find an inquiry in regard to babbitting bearings. Your inquirer may perhaps be interested in a small book which gives some information relating in part to his problem: "White Metalling" by H. Warburton; the mixing, melting, founding and machining of white metals for bearings, gland packings, etc. 80 p., 1944. Emmott & Co., Ltd., 78 Platine Rd. 20, Manchester, England.

E. H. McCLELLAND,  
Technology Librarian

Carnegie Library of Pittsburgh,  
Pittsburgh 13

● Many thanks for this suggestion.—Ed.

## ELECTROPLATERS SUPPLIES

Sir:

I should like information on copper, brass, zinc and silver anodes, specifications as to the forms or shapes generally used, such as "cast elliptical" 15 in. and longer. "Rolled oval," curved, etc. Is there any publication giving standards, tolerances, dimensions and purity acceptable to the trade?

F. A. MORIN

3717 Parkside Drive, Baltimore 6

● The term elliptical or oval refers to the cross-section of the typical anode bar. In most instances these are in straight lengths but they are also produced in curved lengths for special requirements. Bulletins are obtainable from suppliers of platers materials, describing the products used by platers. A very good book on the subject is "Modern Electroplating," published as a special volume in 1942 by the Electrochemical Society, in care of Columbia University, New York City.—Ed.

## A LETTER FROM GREECE

Sir:

We have the honour to inform you that we have remitted our subscription for *THE IRON AGE* for the year 1940. Owing to the war and the enemy occupation of our country we received no number of your periodical for that year. Please forward us all the numbers published for the year 1944 against banking cheque and continue to send also the numbers to follow for the present year.

S. T. ZIVELY

Sheet Steel & Tin Plate Co., Ltd.  
of Greece,  
Benaki St. 24, Athens

## GAS vs. LIQUID CARBURIZING

Sir:

The article on the heat treatment of aircraft gears by R. E. Liebendorfer in the April 19 issue contained disparaging remarks on salt bath heat treatment which we do not approve. Gas furnace treatment is said to provide: (1) "Freedom from corrosion

from salt remaining in recesses of intricate gears." Any good power washer will remove salt from gears satisfactorily. Many thousands of parts daily are salt bath treated and subsequently cleaned; the number of complaints on unsatisfactory cleaning is negligible. (2) "Quality control of the process, as opposed to batch control." Both liquid and gas carburizing may be processed in batches or in continuous operation. There are many conveyorized salt bath furnaces where parts are placed on fixtures at one end and removed at the discharge end. Time cycles are easily regulated and temperatures in liquid baths are more uniform. Control of the liquid carburizing bath consists only of a daily check of cyanide content. (3) "Ability to die quench complicated gears which distort during carburizing." Well, gears have been reheated in salt baths and die quenched for many years, and are still being treated successfully in that manner. (4) "Responsibility for metallurgical quality fixed with supervision, the laboratory, and automatic instruments rather than the individual worker." Why shouldn't the plant operating salt bath furnaces have automatic instruments, a laboratory and adequate supervision, as well as the plant using gas furnaces? As a matter of fact, it is generally conceded that liquid carburizing baths are much more easily controlled than gas furnaces, and require a minimum of skilled personnel. Incidentally, salt baths are suited to the cycle anneal described in the article: 1 hr. at 1380 deg. F., rapid cooling to 1100 deg. F., and holding for 2 hr. at the latter temperature.

PAUL H. KRAMER,  
Technical Director

Park Chemical Co.,  
307½ Military Ave., Detroit 4

● Your observations on this controversial subject are indeed welcome.—Ed.

## BERYLLIUM COPPER

Sir:

We would appreciate reprints of the following articles: "Heat Treating of Beryllium Copper," Feb. 24, 1944; "Predicting Spring Performance of Beryllium Copper Wire & Strip," July 8, 1943, and "Beryllium—A Versatile Element," Sept. 21, 1939.

W. L. SCHMUNK,  
Manager of Operations

Athenia Steel Co.,  
Clifton, N. J.

● Tear sheets have been mailed.—Ed.

## MALLEABLIZING IRON

Sir:

We would greatly appreciate obtaining 3 more copies of the article "Short Cycle Malleablization of White Cast Iron" from the Jan. 8 issue of

your magazine. Please bill us for any expense incurred.

D. STEINER,  
Metallurgical Dept.

Chicago Vitreous Enamel Product Co.,  
Cicero, Ill.

● Tear sheets mailed with our compliments.—Ed.

## PERSONAL ERROR

Sir:

Under "Personals" you state that I have retired. This is not the truth. The L. E. Meidinger Co. is still in business and continues to represent Granite City Steel Co., Continental Foundry & Machine and several others.

L. E. MEIDINGER

● Sorry for this error which we hope has not caused embarrassment.—Ed.

## DENSITE

Sir:

Please send us information on Densite.

M. W. WARD

Industrial Designers of Ohio,  
Cincinnati, Ohio

● We have asked the Pulp Products Div. of West Virginia Pulp & Paper Co., 230 Park Ave., New York, to send catalog information on this product.—Ed.

## CHEMICAL CONSUMPTION

Sir:

From what source could I obtain information on yearly totals of chemicals used by the plating industry and other industries; chemicals such as nickel, copper, cadmium, zinc, lead salts; cyanides, caustic soda, boric acid, etc.?

HAROLD NARCUS,  
Consulting Chemist

24 Sidney Ave., Holyoke, Mass.

● We believe this information to be obtainable only from government sources and suggest you communicate with the Bureau of the Census and the Chemicals Branch of WPB at Washington, D. C.—Ed.

## LOCK WASHERS

Sir:

Can you inform us where we could purchase steel lock washers of small diameter?

W. J. SNELL

Snell Machinery Supply Co.,  
El Paso, Texas

● A list of producers is on the way.—Ed.

## DRILLING SQUARE HOLES


Sir:

We have recently been confronted with the problem of drilling square holes in metal stock without the aid of a broach. An article in *THE IRON AGE* described this operation by using a drill press and we would appreciate information concerning process and equipment.

J. F. HOTCHKISS,  
Chief, Tank-Auto Branch,  
Industrial Div.

Army Air Forces,  
Rochester Ordnance District, N. Y.

● Required tools are supplied by Watts Brothers Tool Works, Wilmerding, Pa.—Ed.



# Those **ADDED** 7 and W OPERATIONS

Several times between a sheet of steel and this finished T & W deep-drawn stamping, something has been added that was not on the blue print. Although seldom the same, these extra operations are always drawn from the great fund of experience accumulated at Transue's. Die design, metal conditions, press operations, proper annealing—all require the combined knowledge of experienced men. Here at Transue's each deep-drawn job receives the attention of executives, engineers and highly skilled workmen. These added operations assure high quality and finish.



SALES OFFICES: NEW YORK, PHILADELPHIA,  
CHICAGO, DETROIT, INDIANAPOLIS, CLEVELAND





# This Industrial Week

- **Victory Cuts Steel Order Volume**
- **Cancellations Continue to Be Light**
- **Steel Ingot Rate Declines to 95.5%**

**T**HE unconditional surrender of Germany this week was having immediate repercussions in the steel industry with the certainty of more to come as definite cutbacks in war programs made their appearance.

Steel order volume in the past week dropped sharply from the high level which has been maintained since the first of the year. The most recent weekly total of steel orders reached the lowest point for 1945.

April order volume, however, was only slightly lower than March and production and shipments for that month held up well despite the coal strike, labor difficulties and manpower shortages. The rapidly disintegrating war situation early in the week placed the spot light on consumer inventories which may influence considerably order volume in the months ahead.

Steel mills generally at mid-week were still awaiting signs of a flood of cancellations. To date cancellation volume has remained on a rather even keel and with some companies orders were still slightly ahead of shipments. Some steel reports from responsible sources indicated that cutbacks on war programs already made will begin to definitely show up on mill schedules within the next two or three weeks.

Cancellations already received by steel mills although small in volume early this week have for the most part involved armor plate for tanks, shell steel and some sheets for landing mats. The shell steel directive has been reduced for June and July about 20 per cent but reliable estimates of actual shell steel cancellations yet to come run from 40 to 60 per cent.

In Cincinnati last Saturday plans were made for approximately a 50 per cent slash in the heavy shell steel program involving 240 mm. shells and 8 in. shells. In St. Louis in the latter part of this week it is expected that the 105, 90, 81, and 75 mm. shell programs, and the 60 mm. mortar shell program will take about a 50 per cent slash. About the only ammunition programs which this week were holding up are those involving rocket and bomb production. These were still being increased.

The heavy artillery ammunition cutbacks are regarded by many sources as only the opening gun on cancellations which will sweep order books in the next 30 or 60 days. Operating rates may drop from present levels to as low as 70 to 85 per cent for individual producers. Such a decline in raw steel output, however, will definitely be a temporary situation. As validated or priority carrying civilian business goes on rolling mill schedules, activity in the steel industry is expected to snap back to near capacity.

As reported last week the three months following VE-Day will find steel cutbacks averaging 2,800,000 tons with most of this released steel definitely scheduled for essential civilian activity such as railroads and farm implements. The automobile industry, however is expected to share in the residual after the

most essential civilian needs are taken care of. In subsequent quarters it is expected that steel cutbacks will release as much as 3,000,000 tons of steel every three months, with the possibility of the tonnage increasing as cutbacks become more numerous.

Improved steel deliveries during March and April halted the drain on stocks which had resulted from stepped up manufacturing rates in January and February. In some cases steel arrived faster than it could be used. With war contractors having been assured that they will not "hold the bag" on liquidation losses, there has not been the same tendency towards hand-to-mouth purchasing which prevailed during the peace-rumor period last fall. That this situation may mean that as contracts are actually cancelled surplus stocks may be found to be considerable. Should this prove to be true, new steel orders for some products in the reconversion period may be less than had been anticipated.

Efforts have been made by WPB to redistribute dwindling plate orders for maximum utilization of the steel industry's facilities. One major producer has been directed to remove all plate production from its continuous sheet mills. Despite the clamor for sheet production, these facilities so far can only be used for the output of heavy gage sheets because of the manpower shortage in finishing departments.

The sheet situation is typical and some operating rates may slump as the plate load drops. A new Maritime Commission cut practically eliminates plate demand as a major factor in July output with some of the largest former plate suppliers having no plate schedules for the Commission in August. In an effort to maintain the production at the Geneva plate mill in Utah, it is understood that about 6000 tons of plates originally scheduled for production in the Chicago district have been transferred to that mill. Producers point out that Navy plate cancellations thus far have been minor and that a big cancellation from this source would further substantially reduce available plate business.

The steel industry this week was still awaiting the price announcement expected to be put out by OPA in the near future as reported last week in THE IRON AGE. The adjustment when it comes will enable steel companies to obtain relief from losses now being incurred in many steel items and also to compensate for the certainty that cancellations will remove profitable business from steel company books.

Steel ingot output this week declined one-half point to 95.5 per cent of rated capacity. District operating rates are as follows: Pittsburgh 93.5 per cent; Chicago 98.5 per cent; Youngstown 94 per cent; Philadelphia 97 per cent; Cleveland 97.5 per cent; Buffalo 104.5 per cent; Wheeling 91 per cent; Birmingham 99 per cent; Detroit 98.5 per cent; Cincinnati 102 per cent; Western 81.3 per cent; St. Louis 94.5 per cent; Eastern 93.5.

• ST  
be al  
Japan  
war-s  
Steel  
man  
Mr. I  
steel  
remain  
ability  
ordin  
sume  
share  
of the  
tribut  
sume  
& St  
dust  
reiter  
lax a  
consi

• PA  
tlemen  
years  
Cater  
to Ca  
tracto  
A 193  
fringe  
The c  
tion v  
accor  
paym  
ternat

• IR  
upper  
of the  
7,282  
April  
were  
picot  
33,679

1.83  
1.80  
1.77  
1.74  
1.71  
1.68  
1.65  
1.62  
1.59  
1.56  
1.53  
1.50  
1.47  
1.44

INGOTS, MILLION NET TONS  
Week  
May 1  
May 8  
Rev

• **STEEL INDUSTRY PLEDGE**—The steel industry will be able to take care of requirements for the war against Japan and at the same time provide all necessary steel for war-supporting civilian activities and for reconversion, the Steel Industry Advisory Committee assured WPB Chairman J. A. Krug last week. The committee further assured Mr. Krug that if all controls for the use and distribution of steel were removed with the exception of priorities on the remaining military load, there would be no question of the ability of the industry to meet civilian needs through its ordinary distribution channels in such a way that small consumers as well as large consumers would receive their full share of steel production. In normal times, 15 per cent of the steel industry's shipments go to the 6000 steel distributors, who in turn serve nearly 250,000 small steel consumers, according to figures compiled by the American Iron & Steel Institute and submitted by the Steel Products Industry Advisory Committee at its recent meeting. Mr. Krug reiterated and emphasized that the policy of WPB is to relax all controls on industry as quickly as it can be done consistent with the prosecution of the Japanese War.

• **PATENT TROUBLE SETTLED**—Compromise settlement of patent litigation carried on over the past 14 years has been made by International Harvester Co. and Caterpillar Tractor Co., entailing payment by International to Caterpillar of \$6 million. The original suit involved 23 tractor patents which Caterpillar claimed had been infringed. A 1936 court ruling found that four of these had been infringed, but the litigation never reached final settlement. The dispute involved elements of tractor design in connection with models of tractors made between 1928 and 1937, according to International Harvester Co. The \$6 million payment will be made in cash, a charge being made by International against its surplus.

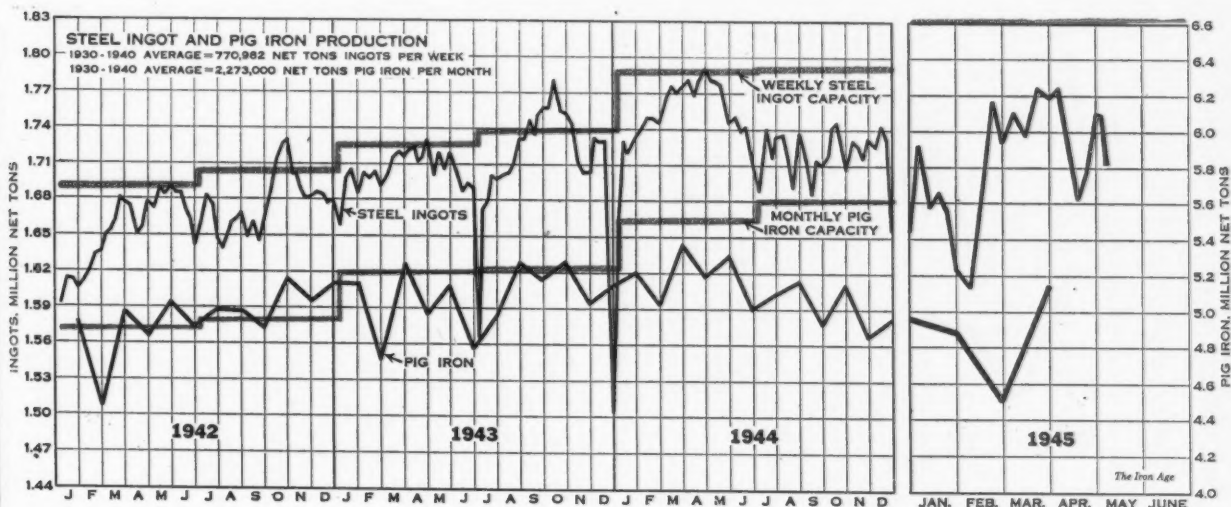
• **IRON ORE**—Shipments of Lake Superior iron ore from upper lake ports during April this year, according to report of the Lake Superior Iron Ore Association, amounted to 7,282,074 gross tons, an increase of 1,993,995 tons over the April movement a year ago. Of this amount 7,234,142 tons were from United States ports and 46,932 tons from Michipicoten, compared to 5,254,400 tons from United States and 33,679 tons from Canada in the first month of the season of

1944. As the shipping season opened on April 1, both this year and last, the cumulative shipments to date are these April figures.

• **CONSTRUCTION MACHINERY**—WPB's Construction Machinery Division said recently that even though military requirements for construction machinery will, in all likelihood, fluctuate after VE-Day, a reasonably steady demand for civilian use may be expected and the industry will be called upon in 1945 to maintain production at or near present levels. The value of construction machinery shipped in 1944 was \$820,000,000, an increase of approximately \$100,000,000 over the value of 1943, the division said.

• **BELGIUM RECIPROCATES**—Belgium and Luxembourg steel mills are producing meter beams for Allied armies under reciprocal aid agreements. A total of 31,089 tons of meter beams have rolled out. Other steel orders filled by Belgian and Luxembourg plants include: 400 tons of splice bars, 4000 pair of Prussian rail, 3700 pair of French rail, and 207,685 ft. of steel cable. Hutting is being produced on a large scale. Five hundred semi-Romney huts, and 10 Romney huts have been manufactured for American armies, in addition to 100 wood huts. Seventeen portable steel buildings, 25 by 100 ft. have also been turned out by Belgian plants.

• **CANADIAN RAILROAD ORDERS**—Canadian locomotive builders are assured of capacity operations throughout the current year and continued high operating schedules for some years to come. In addition to the big orders that have been placed by Canadian railroads and for locomotives for export to India, it now is reported that orders have been received from the Belgian Government for several hundred locomotives to be built in Canadian plants. This latest order has been divided between Canadian Locomotive Works, Kingston, Ontario, and the Montreal Locomotive Works at Montreal. The Montreal order is for 160 locomotives of the 2-8-0 type, two small wheels in front, 8 drive wheels and no small wheels behind. At present this company is working on an order for 177 locomotives for the Indian State Railway, of which 70 have been completed, and will start on the Belgian order in October. Montreal Locomotive Works is turning out about 30 locomotives a month at the present time.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
May 1	93.5	98.5	93.0	97.0	96.0	104.5	91.0	95.0*	101.0*	86.5	104.0	91.5	93.5	96.0
May 8	93.5	98.5	94.0	97.0	97.5	104.5	91.0	99.0	98.5	81.3	102.0	94.5	93.5	95.5

\* Revised





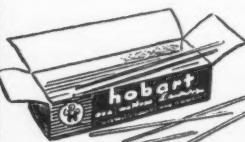
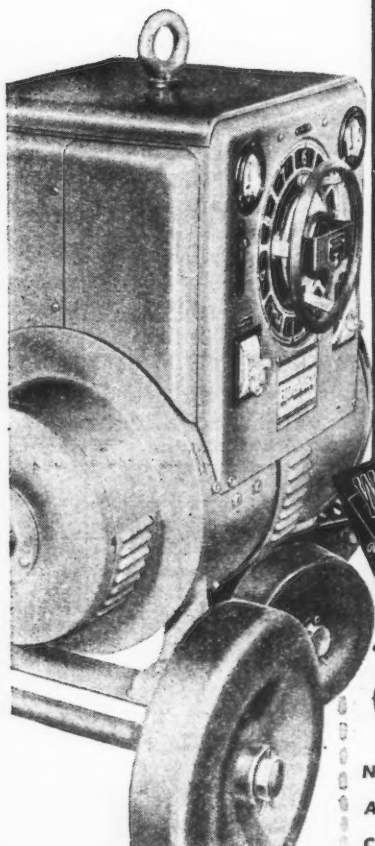
# This You Know—

...how Miracles of War Production  
are being Performed by "Simplified"  
ARC WELDING

## Then You've a Right to Expect...

greater achievements in the future from arc welding, the same as greater achievements are expected of our gallant fighting men. Hobart "Simplified" Arc Welding is continually performing Miracles of War Production and everyday more and more production obstacles are being eliminated through the use of arc welding. The result is increased production of war materials vital to the achievements of our fighting forces. These achievements will extend into the post-war period and you'll find Hobart "Simplified" Arc Welding doing the same "bang-up" job on post-war building and production of civilian goods.

HOBART BROTHERS CO. BOX 1A 532, Troy, Ohio



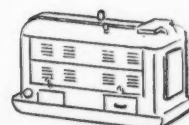
**HOBART ELECTRODES**  
An electrode for every purpose and the right electrode for every job. Thoroughly tested and quality controlled for weldability and producing sound welds.



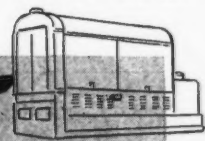
**Free!**  
Welder's Handy Vest Pocket Guide. Has Tables, Charts, Valuable Data.

# HOBART

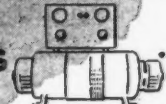
ARC WELDERS  
and POWER GENERATORS



5 KW Elec. Power Unit



35 KVA Elec. Power Unit



Motor Gen. Set

☐ Hobart Power Generators  
(Size)



THE HOBART BROS. CO., BOX A 532, TROY, OHIO  
Send information on items checked.

☐ Electric Drive Welders    ☐ Gas Drive Welders

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



## WPB Gives Industry an Advance Look at Post VE-Day Reconversion Plans

By DON BROWNE

### Washington

• • • With allied victory in Europe achieved, WPB's long-awaited plans for the shift to a one war were made public this week.

The policies to govern the fulfillment of war production requirements and the maintenance of a sound war supporting economy during the six and one-half month transition were contained in a report by the WPB committee on period one.

The report tells what conditions industry is expected to face and sets forth the proposed framework of controls and administrative policies for carrying out combined war and reconversion aims.

#### WPB's overall policies are:

1. Guide cutback distribution throughout the nation as evenly as possible to avoid creating areas of acute unemployment.
2. Remove all restrictions and controls no longer necessary.
3. To reconverting industry, give priority assistance for production and purchase of capital equipment, construction and long lead time materials.
4. Favoring of construction which will provide most employment so long as resources are limited.
5. Give special assistance to small manufacturers, veterans and new producers.
6. Discourage hoarding of scarce resources by maintaining inventory controls.

#### Preliminary reconversion steps WPB expects to take are:

1. Revoke 212 (L, M, P, and U) orders. (All orders governing production will be dropped with the exception of either 9 or 10.)
2. Open-end CMP.
3. Remove rating floors to permit the placing of unrated orders where production and delivery will not interfere with rated orders.
4. Give AA-4 preference rating and the right to place CMP orders to all small manufacturers, including veterans and new enterprises who produce less than \$50,000 per quarter for the transition period.

The report described the postwar economic climate. It said that the latest information available from the military services indicates that munitions production will fall from a scheduled level of \$15,600,000,000 in the second quarter and a current actual quarterly level of about \$15,000,000,000 to \$13,600,000,000 in the third quarter, \$12,400,000,000 in the fourth quarter and \$10,800,000,000 in the first half of 1946.

In percentage terms, these quantities represent decreases compared with the second quarter rate of 13 per cent and 30 per cent respectively. These estimates must still be regarded

as tentative, the report said.

In terms of steel, the report said, the total release in the first quarter of period one, including an estimate of secondary release though "depipelining" of component and material inventories is estimated to be about 2,300,000 tons carbon steel and 500,000 tons alloy steel and in subsequent quarters to about 3,000,000 tons (all reductions are from second quarter military allocations.)

Copper and copper-base alloy product requirements are expected to be reduced by about 500,000,000 lb., or 24 per cent of second quarter supplies and aluminum requirements by about

1,400,000 will find work. This will leave a net addition of only 900,000 temporary unemployment, said the report.

The sub-committee on non-war programs estimated that in terms of carbon steel, priority assistance to five classes of non-war programs would amount to 1,500,000 tons. This compares with claimant agency requests for about 3,000,000 tons and a preliminary screened figure of about 1,950,000 tons.

The sub-committee on reconversion preparation surveyed the needs of 72 civilian industries which have converted a substantial portion of their facilities to war work.

Each company was requested to report on its present production rate, minimum economic civilian "Break-even" rate and its maximum rate,

72 Industries	"Break Even Rate"	Maximum Rate
Total value of production	\$1,200,000,000	\$3,350,000,000
New construction required	41,000,000	230,000,000
New tools and equipment	60,000,000	180,000,000
Materials required in first quarter of Period One		
Carbon steel (tons)	1,200,000	2,500,000
Alloy steel (tons)	70,000	150,000
Copper (lb.)	92,000,000	228,545,410
Aluminum (lb.)	22,000,000	33,000,000
Manpower requirements	900,000	1,600,000

150,000,000 lb., or 21 per cent of second quarter supplies.

The War Manpower Commission has made a preliminary estimate of the manpower release from munitions production by six months after VE-Day amounting to about 1,500,000 workers. Together with a net decrease in the armed services of about 1,000,000 this makes a potential increase of 2,500,000 in the labor market.

The WMC estimates net withdrawals from labor market at 200,000 leaving 2,300,000 desiring work. Of this number WMC believes that about

showing for the latter two rates the new construction, controlled materials and manpower required in the first period one quarter.

In the following table materials figures do not represent quarterly consumption but only part of the materials needed to work toward that rate. It does not include possible demands by new war plants reconverting to civilian production for the first time, nor do all of the industries have reconversion in the narrowest sense.

The results of the survey are shown in the above table.

For most of the industries, the re-

**TRAGEDY ABOARD SHIP—** Repairs are quickly made to the damaged flight deck of the USS Hancock after a loose bomb in the bay of an Avenger torpedo bomber armed itself as the plane rolled down the flight deck, spreading destruction across the ship.





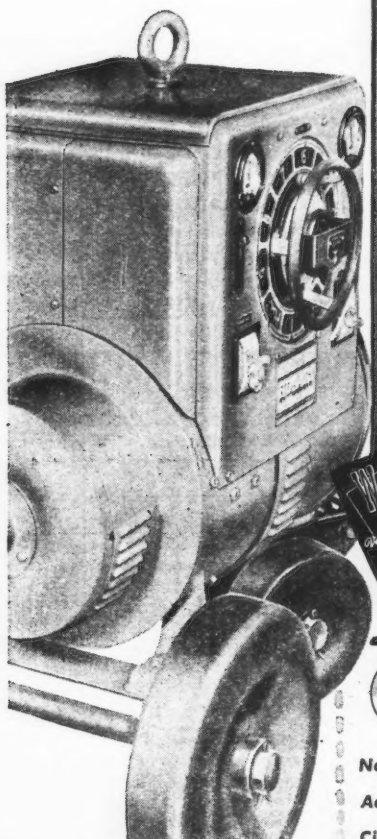
# This You Know—

...how Miracles of War Production  
are being Performed by "Simplified"  
ARC WELDING

## Then You've a Right to Expect...

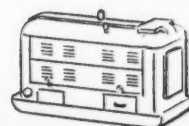
greater achievements in the future from arc welding, the same as greater achievements are expected of our gallant fighting men. Hobart "Simplified" Arc Welding is continually performing Miracles of War Production and everyday more and more production obstacles are being eliminated through the use of arc welding. The result is increased production of war materials vital to the achievements of our fighting forces. These achievements will extend into the post-war period and you'll find Hobart "Simplified" Arc Welding doing the same "bang-up" job on post-war building and production of civilian goods.

HOBART BROTHERS CO. BOX 1A 532, Troy, Ohio

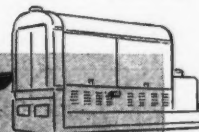


### HOBART ELECTRODES

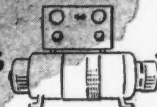
An electrode for every purpose and the right electrode for every job. Thoroughly tested and quality controlled for weldability and producing sound welds.



5 KW Elec. Power Unit



35 KVA Elec. Power Unit



Motor Gen. Set



**Free!**  
Welder's Handy Vest Pocket Guide. Has Tables, Charts, Valuable Data.

# HOBART

ARC WELDERS  
and POWER GENERATORS



THE HOBART BROS. CO., BOX A 532, TROY, OHIO  
Send information on items checked.

☐ Electric Drive Welders    ☐ Gas Drive Welders

☐ Hobart Power Generators  
\_\_\_\_\_ (Size)

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



## WPB Gives Industry an Advance Look at Post VE-Day Reconversion Plans

By DON BROWNE

### Washington

• • • With allied victory in Europe achieved, WPB's long-awaited plans for the shift to a one war were made public this week.

The policies to govern the fulfillment of war production requirements and the maintenance of a sound war supporting economy during the six and one-half month transition were contained in a report by the WPB committee on period one.

The report tells what conditions industry is expected to face and sets forth the proposed framework of controls and administrative policies for carrying out combined war and reconversion aims.

#### WPB's overall policies are:

1. Guide cutback distribution throughout the nation as evenly as possible to avoid creating areas of acute unemployment.
2. Remove all restrictions and controls no longer necessary.
3. To reconverting industry, give priority assistance for production and purchase of capital equipment, construction and long lead time materials.
4. Favoring of construction which will provide most employment so long as resources are limited.
5. Give special assistance to small manufacturers, veterans and new producers.
6. Discourage hoarding of scarce resources by maintaining inventory controls.

#### Preliminary reconversion steps WPB expects to take are:

1. Revoke 212 (L, M, P, and U) orders. (All orders governing production will be dropped with the exception of either or 10.)
2. Open-end CMP.
3. Remove rating floors to permit the placing of unrated orders where production and delivery will not interfere with rated orders.
4. Give AA-4 preference rating and the right to place CMP orders to all small manufacturers, including veterans and new enterprises who produce less than \$50,000 per quarter for the transition period.

The report described the postwar economic climate. It said that the latest information available from the military services indicates that munitions production will fall from a scheduled level of \$15,600,000,000 in the second quarter and a current actual quarterly level of about \$15,000,000,000 to \$13,600,000,000 in the third quarter, \$12,400,000,000 in the fourth quarter and \$10,800,000,000 in the first half of 1946.

In percentage terms, these quantities represent decreases compared with the second quarter rate of 13 per cent and 30 per cent respectively. These estimates must still be regarded

as tentative, the report said.

In terms of steel, the report said, the total release in the first quarter of period one, including an estimate of secondary release though "depipelining" of component and material inventories is estimated to be about 2,300,000 tons carbon steel and 500,000 tons alloy steel and in subsequent quarters to about 3,000,000 tons (all reductions are from second quarter military allocations.)

Copper and copper-base alloy product requirements are expected to be reduced by about 500,000,000 lb., or 24 per cent of second quarter supplies and aluminum requirements by about

1,400,000 will find work. This will leave a net addition of only 900,000 temporary unemployment, said the report.

The sub-committee on non-war programs estimated that in terms of carbon steel, priority assistance to five classes of non-war programs would amount to 1,500,000 tons. This compares with claimant agency requests for about 3,000,000 tons and a preliminary screened figure of about 1,950,000 tons.

The sub-committee on reconversion preparation surveyed the needs of 72 civilian industries which have converted a substantial portion of their facilities to war work.

Each company was requested to report on its present production rate, minimum economic civilian "Break-even" rate and its maximum rate,

72 Industries	"Break Even Rate"	Maximum Rate
Total value of production .....	\$1,200,000,000	\$3,350,000,000
New construction required .....	41,000,000	230,000,000
New tools and equipment .....	60,000,000	180,000,000
Materials required in first quarter of Period One		
Carbon steel (tons) .....	1,200,000	2,500,000
Alloy steel (tons) .....	70,000	150,000
Copper (lb.) .....	92,000,000	228,545,410
Aluminum (lb.) .....	22,000,000	33,000,000
Manpower requirements .....	900,000	1,600,000

150,000,000 lb., or 21 per cent of second quarter supplies.

The War Manpower Commission has made a preliminary estimate of the manpower release from munitions production by six months after VE-Day amounting to about 1,500,000 workers. Together with a net decrease in the armed services of about 1,000,000 this makes a potential increase of 2,500,000 in the labor market.

The WMC estimates net withdrawals from labor market at 200,000 leaving 2,300,000 desiring work. Of this number WMC believes that about

showing for the latter two rates the new construction, controlled materials and manpower required in the first period one quarter.

In the following table materials figures do not represent quarterly consumption but only part of the materials needed to work toward that rate. It does not include possible demands by new war plants reconverting to civilian production for the first time, nor do all of the industries have reconversion in the narrowest sense.

The results of the survey are shown in the above table.

For most of the industries, the re-

**TRAGEDY ABOARD SHIP—** Repairs are quickly made to the damaged flight deck of the USS Hancock after a loose bomb in the bay of an Avenger torpedo bomber armed itself as the plane rolled down the flight deck, spreading destruction across the ship.





conversion time was also stated in months, both for the "break-even" and for the maximum production. The reports vary from no time for industries producing similar items for war use up to 15 months for all-out production of passenger automobiles and 12 months for "break-even" production of clocks and watches. The majority of industries report two to six months required to reach "break-even" production.

In addition, 48 of the reporting industries stated their material requirements to fill component "Pipelines" in advance of actual production of assembly operations.

These requirements amount to about 45,000 tons of carbon steel, 1700 tons of alloy steel, 15,300,000 lb. of copper, 150,000 lb. of aluminum and 30,000 lb. of grey iron castings.

It is evident that WPB believes that there will be a tremendous upsurge of effort to reconvert because of the tightness of retained controls and the relative slowness with which it proposes to lift them.

With respect to the following problems, the committee recommends the following reconversion policies:

**Cutbacks and unemployment.** The report anticipates that there will be three types of areas where cutbacks will occur. In two, where the number of facilities are greater than needed to maintain continuing war production, the committee recommends nothing more than a retarding of collapse through orderly reduction in employment and insuring against sudden shock of simultaneous uncorrelated adjustments by several procurement agencies.

In the first instance, where no posi-

tive action is contemplated, the area does not have other major productive capacity which can be used in the peacetime economy. In the second, non-military production is expected to absorb all workers displaced by contract terminations.

Only in the third, where facilities are greater in number than are needed to maintain continuing war production, but have possibilities of economical peacetime utilization of these or other facilities in the area, are positive steps taken to facilitate reconversion consistent with war production needs.

These steps are: (a) Allocation of new war procurement in loose labor areas (cases one and two) and under principles to be established in directive 2, controlling the placement of new war procurement; (b) allocation of cutbacks to the third type of area under the continuing functions of the Program Readjustment Committee; and (c) redistribution of existing war procurement in unusual circumstances, to free key plants, where the continuation of war production might otherwise prevent large-scale civilian production and employment.

In contrast with Pre-VE-Day cutbacks the period one decisions are being governed by the following factors: (a) Whether the area is a one, two, or multiple industry area; (b) the necessity of maintaining part or all of the productive facilities in war work; (c) the possibility of reconverting or utilizing the facilities in civilian production; and (d) the desire of management to maintain a portion of individual facilities in war production.

Projects under construction are being reviewed to determine desirable

cutbacks in view of the changing military requirements of period one. This review will cover projects approved within six months prior to VE-Day to the extent that (a) they are either federally financed or privately financed with over 35 per cent tax amortization privileges, and (b) they cost over \$250,000 and (c) they are less than 75 per cent complete.

To cushion the shock of terminations and cutbacks, section 944.14 of Priorities Regulation 1 will be amended to permit receipt of completed products and those in production for the particular order, as well as materials loaded or enroute at the time.

Where a reduction of military production might involve a temporary complete cessation of receipts and while excess inventory is being reduced and later resumption of purchasing, permission should be granted to spread the re-scheduling of receipts over a period of six months.

Industries with long-lead times, or reconversion problems will be able to take advantage of the revised Priorities Regulation No. 24 and construction Order L-RQ to secure assistance in getting bottleneck capital equipment and construction projects required to fill out existing plant and equipment to begin or expand large-scale civilian production.

The committee points out that the revisions already made in priorities Regulation No. 24 should be sufficient to supply demands after as well as before VE-Day. The retention of the machine tool Order E-1-B, which grants scheduling authority to WPB may be held in the delivery of specific bottleneck items which might otherwise seriously hamper civilian production.

Reconverting companies will be permitted to acquire 30 days additional inventory to fill for assembly purposes in excess of current of scheduled production. Even higher authorizations will be granted in proper cases. Spot authorization may be used for this.

WPB will establish a flexible means of Priority assistance for manufacturers not participating in an approved program and not qualifying as a smaller business entitled to general assistance.

This assistance will be granted in the WPB field office up to \$25,000 per allocation on a modified WPB-541-PD1A; larger applications should be processed in Washington with an examination by the supplying industry divisions.

During the transition period, the

**CAPTURED JET ME 262**—American soldiers examine a German jet propelled ME 262 taken intact on an airfield near Frankfurt. The plane mounts four 30 mm. cannon, carries about 475 gal. of fuel and can travel at about 500 miles an hour. The cowling of one of the two Junkers Jumo 004 jet engines on the ground under the wing.



assistance should be a preference rating of an AA-4 and a firm CMP allotment if delivery is required prior to T-Day, or a CC rating if later delivery is involved. T-Day is the end of period one.

The field offices will also grant out-of-lines ratings up to \$5,000 (compared with \$2,500 now permitted).

The report proposes that during the transition period of six and one-half months following VE-Day, to continue affirmative WPB assistance, in the form of firm controlled material allocations and AA Priority ratings to war supporting and essential civilian requirements. In general, such assistance will be limited to activities closely related to the war and of the general type which have been supported throughout the two-front war. Less essential civilian production on an unrated basis is expected to begin in some measure immediately. It is for this reason that the committee suggested that CMP be open-ended and to remove most rating floors.

## Canadian Steel And Iron Output Reach New Highs in March

### Toronto

• • • Iron and steel production in Canada for the month of March exceeded the rate for either of the two previous months this year, while output of steel ingots and castings made a new all-time record for the Dominion and pig iron attained the highest total since last July. During March steel production held an average level of 91.88 per cent while pig iron output was 71.68 per cent of total rated capacity.

In March pig iron production amounted to 165,517 net tons compared with 149,487 tons in February and 168,047 tons in March last year. For the month under review output included 134,325 tons of basic iron of which 13,921 tons were for sale and the balance for use of producing companies; 16,924 tons of foundry iron, and 14,568 tons of malleable iron, all the latter two grades being for sale. Throughout the month nine furnaces were blowing with five blown out.

For the first three months this year pig iron production totaled 471,273 net tons against 442,053 tons in the first quarter of 1944 and 414,668 tons in 1943.

Output of ferro-alloys in March was 16,434 net tons, compared with 13,402

In addition to those indirect military and civilian programs currently receiving assistance, the following classes of non-war programs are regarded as eligible to receive affirmative priority assistance:

1. Restoration of minimum levels for war supporting programs which were temporarily reduced in the second quarter of 1945 below a possible continuing rate, even on a two-front war basis, owing to the extreme stringency of steel supplies. This category includes—rails, farm machinery, oil drilling material, general industrial MRO.

2. New or expanded production of a very limited number of civilian products now in such scarce supply as to endanger the war-supporting economy. This list includes mechanical refrigerators and washing machines in limited quantities. Program support will be granted for such items only up to the essential level, any additional production taking place on an unrated basis.

3. Minimum essential exports, particularly the immediate needs of liberated areas for the rehabilitation work to restart their economies at a going rate.

4. Production of tools, other capital equipment, construction materials and components needed to speed up reconversion.

5. A limited quantity of materials for filling the pipeline of reconversion industries with long lead time items, to the extent this cannot be done on an unrated basis.

tons in the previous month and with 13,427 tons in March, 1944. The following alloys were produced: ferro-silicon, silicomanganese, ferromanganese, ferrochrome, chrome-x, and ferrophosphorus. For the first three months this year ferro-alloys production totaled 41,966 net tons compared with 44,642 tons in 1944 and 56,973 tons in 1943.

Production of steel ingots and castings in March was at the high total of 277,461 net tons, compared with 250,464 tons in February and 275,539 tons in March last year. Output in the month under review included 261,524 tons of steel ingots and 15,937 tons of castings. For the first three months of the year cumulative production of steel ingots and castings was 796,647 net tons, compared with 747,577 tons in 1944 and 723,558 in the first quarter of 1943.

## Ford Changes Buffalo Tank Part Machining Plans

### Buffalo

• • • The Ford Motor Co. has dropped plans to transfer a number of machining operations on V-8 tank engines from Detroit to its Buffalo assembly plant. Instead, the property will be used to store parts and accessories for Ford cars and trucks until the company's postwar automobile production program gets underway.

## Castings Demand To Remain Strong After VE-Day Cuts

### Washington

• • • Particularly citing an immediate need for freight cars and civilian trucks, WPB officials at a recent meeting of the Malleable Iron Industry Advisory Committee emphasized that there will be a continued heavy demand for castings far beyond VE-Day and a WPB Automotive Division official said that the transportation equipment supply problem in the Pacific would be a bigger job than that in Europe.

These points were brought out to make it clear that the malleable iron situation is still critical despite the fact that March production reached 86,000 tons, the highest level since production figures have been compiled by WPB. Output in February was 79,100 tons while in January it was 83,770 tons. However, the tight situation is reflected in the fact that the order backlog increased from 483,981 tons on Jan. 1 to more than 500,000 tons at the end of March. Also it was said that cutbacks do not appear to have increased available manpower and no early relief from labor shortages which have been acute in foundries is indicated.

The Automotive Division official disclosed that the proposed 1946 new truck equipment and spare program, even after VE-Day, would be at a level higher than in 1945.

## Wage Petition Is Denied

### Connersville, Ind.

• • • Petition of Steel Kitchens Corp., Connersville, for review of a Sixth Regional War Labor Board decision on wage contract extension, has been denied by the National War Labor Board.

On Oct. 27, 1944, the Regional Board had directed that the existing contract with United Auto Workers, Local 390, CIO, providing for a 5c. automatic wage progression every 30 days until the top grade is reached in a job classification, should be extended to the aircraft division from the date of its establishment. The company appealed, objecting that the progression schedule, coupled with elimination of B grades in 12 classifications would elevate unqualified employees to the top of the wage rate range too rapidly. The company also objected to top rates ordered for certain classifications.



## Ordnance Meeting Slashes Heavy Shell Program in Half; More Cuts Due

### Cincinnati

• • • Readjustments in the Army's heavy artillery ammunition program totaling 10 per cent of the total ammunition program, excluding small arms ammunition, but affecting only about 7500 workers throughout the country, were announced at a meeting held in Cincinnati by the Army and Washington representatives of the War Production Board, War Manpower Commission, and Smaller War Plants Corp., as well as the 44 war contractors from all over the country that will be involved in the cutback.

The revisions and cutbacks, totaling about 50 per cent of the heavy shell program, will affect only the metal components of the 155-mm., 240-mm., and 8-in. caliber programs. It was pointed out that the revisions are in line with the gradual readjustments of the nation's war production from a two-front to a one-front war. The labor impact will be proportionate so that not more than 100 to 200 workers are expected to be released at a majority of the affected plants. Normal turnover is expected to take care of most of these workers, and the remainder may be utilized in other critical war work through the facilities of the War Manpower Commission.

The plants affected, whose release of labor will vary as a result of local readjustments, are as follows:

Central Foundry, Holt, Ala.; National Cast Iron Pipe Co., Birmingham, Ill.; S. F. & John Barnes Co., Rockford, Ill.; Giddings & Lewis, Fondulac, Wis.; Minneapolis-Moline Power Implement Co., Minneapolis, Minn.; Atlas Imperial Diesel Engineering Co., Mattoon, Ill.; Willys Overland Motors, Toledo, Ohio; GMC Olds Division, Lansing, Mich.; Omaha Steel Works, Omaha, Neb.; Goslin Birmingham Mfg. Co., Birmingham, Ala.; Gullet Gin Co., Amite, La.; Rockwood Alabama Stone Co., Russellville, Ala.; J. I. Case Co., Racine, Wis.; National Can Corp., New Brighton, Minn.; GMC Fisher Body Division, Grand Rapids, Mich.; GMC Pontiac Motors, Pontiac, Mich.; Rheem Mfg. Co., Danville, Pa.; Rheem Mfg. Co., Williamsport, Pa.; Pullman Standard Car Mfg. Co., Butler, Pa.; United Engineering & Foundry Co., New Castle, Pa.; U. S. Hoffman Machine Co., Syracuse, N. Y.; Kaiser Co., Inc., Shell Division, Oakland, Calif.; Reed Roller Bit Co., Houston, Tex.; Hughes Tool Co., Houston, Tex.; U. S. Pipe & Foundry, Addyston, Ohio; Jones & Laughlin Steel Corp., McKeesport, Pa.; Petroleum Heat Power Co., Stamford, Conn.; Long Reach Machine Works, Houston,

Tex.; E. G. Budd Mfg. Co., Bustleton, Pa.; Treadwell Construction Co., Midland, Pa.; National Tube Co., McKeesport, Pa.; American Car & Foundry Co., Buffalo, N. Y.; Watertown Arsenal, Watertown, N. Y.; Batavia Metal Products, Batavia, Ill.; Kentucky Shell Mfg. Co., Wilder, Ky.; Struthers-Wells, Titusville, Pa.; American-Type Founders, Elizabeth, N. J.; Harrisburg Steel Co., Harrisburg, Pa.; Kelly-Springfield Tire Co., Cumberland, Md.; Oil Well Supply Co., Oil City, Pa.; National Steel Corp., Weirton, W. Va.; Weirton Steel Co., Weirton, W. Va.; Kaiser Industries, Denver, Colo.; Babcock Printing Press, New London, Conn.

### Pittsburgh

• • • Producers of heavy shells in this area found their contracts cut by approximately 50 per cent after the Cincinnati meeting, Saturday, May 4. While the cutback is proportionately large in so far as shell output is concerned, it will have very little effect in the local labor supply, since most of the companies affected by the cutback will utilize the available labor in other operations.

Locally the cutbacks were approximately as follows:

United Engineering and Foundry Co., at New Castle, is completely out of the 8-in. program, and the quota on 155-mm. shells has been cut from 100,000 to 70,000. Crucible Steel Co. of America and Treadwell Construction Co., both at Midland, Pa., are completely out on the 240-mm. shells. Weirton Steel Co., at Weirton, W. Va., one of the best producers of 8-in. shells, has been cut from 65,000 to 30,000. Jones & Laughlin Steel Corp., McKeesport, Pa., which has been producing about 35,000 per month on a 50,000 schedule, has been cut to 30,000 on the 8-in. shell, and on the 8-in. M-103, the schedule has been cut from 10,000 to 5000.

National Tube Co., at Christy Park Plant, had a schedule of 20,000 cut to 10,000 on the 240-mm. shell. Pullman Standard Mfg. Co., Butler, Pa., had a 4.5-in. rocket contract cancelled completely, while an 8-in. shell forging contract was cut 50 per cent. Kelly-Springfield, at Cumberland, Md., had a 16,000 shell contract for 8-in. shells cut to 10,000, while Oil Well Supply Co., Oil City, was cut from 16,000 to 5000 on 8-in. shells.

Similar cuts have been made in shell production in all producing areas

throughout the country, but these are the cutbacks in this area.

Producers of components likewise are cut back in proportionate amounts.

These component manufacturers are very numerous and widely scattered, and were advised of the individual company cutbacks this week. Typical of such cutbacks will be a 50 per cent cut in 6-in. and 8-in. shell bands that are being made by International Nickel Co., Huntington, W. Va., where about 1,000,000 of each size are being produced monthly. Likewise, the Louis Marx Co. plant in West Virginia will likely experience a substantial cutback on some of the components that it produced.

At St. Louis, on May 11, another Ordnance meeting is scheduled to continue the cutbacks in other production phases. At this time, the cutbacks announced will cover 105, 90, 75 and 81-mm. shells, and the 60-mm. mortar shell. At least four companies in this area will be affected, pretty much in the order named. Oliver Iron & Steel Co., West Pittsburgh, Pa., will probably go out of the 105-mm. shell program completely, since only about 40,000 shells have been produced at this plant over the period of a year, far behind the proposed schedule.

Pressed Steel Car Co., McKees Rocks, Pa., likewise will be cut back sharply on its schedule for 105 and 75-mm. shells, as will Louis Marx on the 105-mm. contract. Likewise, Louis Marx will end up production of the 20-lb. fragmentation bomb about the 20th of the month, and the 60-mm. mortar shell program with this company will probably be killed at the St. Louis meeting.

Pullman Standard, at Butler, which has had a very enviable record on 105-mm. shells, will probably retain the best part of the production quota. Jones & Laughlin Steel Corp., which had its Keystone shell plant construction program canceled sometime ago, also had its 105-mm. smoke shell contract at McKeesport canceled a short time ago. Likewise, its 90-lb. fragmentation bomb contract was canceled, and the contract for the 20-lb. fragmentation bomb will be finished this week.

Some of the other major producers of heavy shells that were affected by the cutback are as follows: GMC plants at Pontiac, Grand Rapids, and Lansing, Mich., Kaiser Co., at Oakland, Calif., and Denver, Colo., Harrisburg Steel Co., Harrisburg, Pa., Edward G. Budd Mfg. Co., Bustleton,



Pa., and others. A total of 45 shell plants were involved in the cutback.

Meanwhile, rocket and bomb demands continue upward instead of downward. In addition to the increase in the 500-lb. contract at Standard Steel Spring Co., and Wheeling Steel Corp., which were boosted from 50,000 to 60,000, and from 100,000 to 200,000, respectively, the Scaife Co., Oakmont, Pa., likewise had its schedule raised. Wheeling, bedeviled by floods and other difficulties had a bad month in April, turning only a little better than 50 per cent of its monthly quota.

Flannery Bolt Co., Bridgeville, Pa., will get into production this month on a new 115 mm. rocket, and Blaw-Knox at Martin's Ferry, W. Va., is expected to go back into production very soon on the 1000 lb. and 500 lb. bomb.

Tungsten carbides hold the spotlight as a core material for shells, with a production program that presently will cost between \$40,000,000 and \$60,000,000 in plants and production. Carboly Co., will quite obviously be the heavy artillery in the program, with at least two new plants. Carboly is expected to operate a new tungsten reducing, carburizing, and fabricating plant at New Martinsville, W. Va., on which construction will start. This alone is about a \$6,000,000 program. The company will also operate what is believed to be a duplicate plant to be built in Detroit, near the company's present facilities.

## Packard Earnings Off Due to Cutbacks

### Detroit

• • • Effects of "production VE-day," predicted to materialize as manufacturers receive cutbacks in war goods, are already reflected in 1945's first-quarter figures, according to a financial statement released by the Packard Motor Car Company.

Packard, now producing Rolls-Royce aircraft and Packard PT-boat motors, reports factory sales and billing of \$97,977,931 for the period, a reduction of \$15,956,568 under first three months' volume last year. Net profits for 1945's first quarter was \$655,420, or \$430,569 less than the 1944 January-through-March earnings of \$1,085,989.

"Reduced volume and smaller fees on engine contracts, with consequent higher overhead largely account for this profit drop," stated Geo. T. Christopher, Packard president and general manager.

## Alcoa Process Recovers Pure Aluminum from Salvaged Aircraft

### Pittsburgh

• • • A process has been devised to salvage aluminum from crashed, war weary and obsolescent aircraft so as to prevent contamination by other metals. Wrecked aircraft scrap has in the past been practically worthless because of the difficulty of purifying it. The process is a development of the Aluminum Ore Co., a subsidiary of ALCOA, and the Air Technical Service Command working with the Redistribution and Salvage Office of the Army Air Forces.

The process returns the scrap aluminum to the Bayer Process used in the manufacture of alumina from bauxite. Alumina, or aluminum oxide, is an intermediate product reduced electrolytically to metallic aluminum.

In the process planes are introduced into a bath of caustic soda which dissolves the aluminum; but steel, copper, bronze, rubber, or other non-aluminum parts remain in solid form.

The alloying elements in aluminum alloys are not attacked by the caustic and so remain in the sludge as finely divided particles.

Solid impurities are removed from

the solution in filter presses, and the liquor is returned to the Bayer Process to be manufactured into pure aluminum oxide by pumping the liquor into huge precipitating tanks and allowing it to cool. In time, crystals of aluminum hydroxide settle out. Removed and washed to free them of caustic soda, they are then heated in rotating kilns to drive off the water and leave commercially pure alumina.

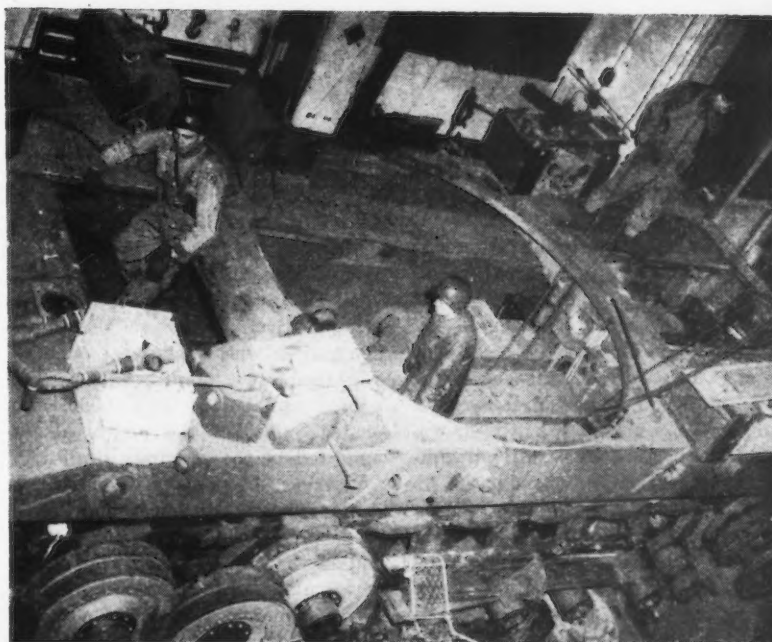
## Midland Steel Net Up

### Cleveland

• • • The Midland Steel Products Co. reports net earnings for the first quarter of 1945 amounted to \$377,596 after all charges, including provision for federal taxes on income and for contingencies, compared with net earnings of \$370,910 for the first quarter of 1944.

After deduction of quarterly dividend requirements of \$2 per share on the 8 per cent cumulative first preferred stock and 50c. per share on the \$2 non-cumulative dividend shares, there remained \$159,846 for the common shares. This is at the rate of \$.6805 per share compared with \$.6519 per share for the same period in 1944.

**CAUGHT SHORT:** American soldiers examine a new type of German tank which was less than half completed when captured in a factory scarcely big enough to house it. The tank was equipped with a larger gun turret than previous types and five inch armor. The tracks were 39 in. wide but the size of the guns was not known.



## Steel Mills Poised for News Of Cutbacks on Heels of Victory

### Pittsburgh

• • • Mills here are awaiting with varying degrees of anxiety the inevitable cancellations of steel orders that must come as the result of recent and pending cutbacks. None of the mills report that anything approximating the scope of the cancellations that will come has as yet put in an appearance. There have been some minor cancellations, but nothing early this week that would indicate the wiping out of any major production program.

Some officials state that they have been advised that these cancellations will start in about two or three weeks. The cancellations, meaning those of the Army, will be the beginning of a wholesale cutback in the production of equipment for the Army. Already there have been cutbacks in small arms and ammunition, light and medium artillery, tanks, and other items. Aircraft cutbacks likewise have been made. At Cincinnati this week final plans have been made to cutback the heavy artillery program. Some observers indicate that they have been advised that in artillery and shells alone the immediate cutbacks may get as high as 80 per cent of the present contracts immediately.

The one phase of the Army production program that has not been

touched and probably will not be touched for some time is the rocket and bomb program. This program is still on the increase, with many companies being ordered to expand their production facilities to meet new and enlarged production quotas.

While cutbacks are inevitable, many companies are having difficulty in keeping facilities in operation after cutbacks. This is especially true of the smaller companies. The recent announcement that WPB expected to revoke 212 materials restrictions orders on V-E Day will partially solve this problem, but some producers are faced now with it. Companies that already have been caught in cutbacks are speculating on how they can get into some kind of production in the face of present materials restrictions.

While the Army continues its program of cutting back the Navy has shown very few indications of order cancellations. There are some programs that are being completed for the Navy in this district, mainly the landing craft work.

The Navy rocket program, like that of the Army, is still on the increase. As experiments are completed on new sizes of rockets, production is quickly started. One company in this area will operate a new Navy rocket tube plant that is being built now adjacent to the company's present facilities.

## Residual Metals Show General Increase In First Study Since '38

### Columbus

• • • Residual metal contents of plain-carbon open-hearth steels made in 1944 averaged generally somewhat higher than in 1938—the last prior year in which study of foreign residual metals in basic open-hearth steels was made—a report presented by John D. Sullivan before the Open-Hearth Conference of the American Institute of Mining and Metallurgical Engineers in Chicago recently shows.

Written by Messrs. Sullivan and A. E. Pavlish, both of the staff of Battelle Institute, Columbus, Ohio, where analyses of samples of steels were made, the report shows the significant changes that have taken place in open hearth steels since the change to a war economy. Nickel

content is up appreciably, and for the first time molybdenum has entered as a major residual metal. Copper and chromium have advanced slightly.

As in previous studies made from 1930 through 1938, cooperating steel plants in the United States and Canada took samples from representative open hearth heats before alloy additions were made for the 1944 study. At the end of each month composite samples were sent to Battelle Institute, where a semi-annual composite was made for analysis. Eighteen steel plants, with a rated gross tonnage of 10,100,000, cooperated; most of the plants also cooperated in the previous studies.

Nickel, the analysis shows, has demonstrated the most marked increase, and the content now almost equals that of copper. The average of all plants, based on weighted tonnage capacity, was 0.080 per cent, which contrasts with 0.044 in 1938.

From 1929 to 1938, the average by tonnage capacity varied from a low of 0.037 per cent to a high of 0.050. The current increase reflects the presence of a higher percentage of nickel in the scrap used, the report states.

Copper has not changed appreciably, and the 1944 percentages do not represent maximum figures over the past 15 years. It is not unexpected that copper went up less than nickel, since the increased use of hot metal in duplexing the flush practices has decreased the percentage of scrap in the charge. Also, there has been no appreciable amount of copper alloy steel made, whereas there has been an enormous increase in the production of nickel-bearing steels. Although attempts have been made to segregate alloy scrap, considerable nickel gets into plain-carbon steel heats in the form of turnings and other light scrap.

Residual manganese is relatively high, particularly in some plants. According to the report, this reflects the production of proportionally less low-carbon and more high-carbon heats. On the average, the heats are not being oxidized down so far as they were when the studies of residual contents were recessed at the end of 1938. Manganese, of course, is also intentionally added to steel.

Chromium content increased from 0.030 to 0.038 per cent. These results, the report states, go hand-in-hand with the residual manganese and reflect the lesser degree of oxidation now practiced. Undoubtedly, there is more chromium in the open-hearth charge, but the residual content depends in a large degree on oxidation and slag conditions.

Molybdenum, for the first time, is reported for all plants, although in the past, general composite samples were sometimes analyzed for this element, but in no previous instance was an appreciable amount found. The average now is about the same as for tin, and the individual plants varied from a low of 0.005 per cent to a high of 0.029 per cent.

Tin has held about constant for the past ten years and shows no appreciable change for 1944. This is attributed largely to the fact that less cans, detinned scrap, etc., have entered the charge during the war years.

The results of this study on residual metals are interesting in contrast to a recent report on enemy materiel made by Battelle metallurgists. German steels, on the whole, are higher in residuals than ours, except possibly in nickel.



## New Pay Contract for Reynolds Metals Workers on Progressive Scale

By T. E. LLOYD

### Louisville, Ky.

• • • A new wage scale for workers of the Reynolds Metals Co. plants here has been adopted by the company and the union after approval by the War Labor Board which both increases the top wage rate and reduces by half the time required for employees to reach this top rate. The wage adjustments progression schedule will result in an annual pay increase of about \$175,000 to the 4000 to 5000 Reynolds workers in the company's 10 Louisville plants, it was announced jointly by the company and the United Aluminum, Tin, and Foil Workers Union (AFL).

The new wage scale, shown in the accompanying table, is the result of three years study on the progression scale, and the War Labor Board stated that it is unique in American industry. Company and union officials estimate that 2500 workers in the Louisville plants will benefit immediately by the new schedule, which was made effective on April 4. It is believed that similar scales are being worked out for all Reynolds plants, but details have not yet been completed. The succeeding wage scales will be patterned pretty closely after the Louisville plan.

Under the new pay plan, a worker attaining the top scale in his grade of work may elect to enter a higher pay bracket by taking another higher job classification, and in this manner reach the top pay scale. The WLB directive that approved the plan referred to it as "speeding up of the automatic progression plan."

The schedule sets up 14 job classifications, instead of the original plan which only provided for about eight or

ten. The starting rate is scaled from 62 to 85c. an hr., depending upon the job classification, whereas formerly there was a standard starting rate of 62c. an hr. Top rate of pay is \$1.05 an hr., attained after 11 months, whereas formerly the top rate was under \$1.00 an hr., and it was attained only after about some 20-odd months of service.

### Tool Men Caution Against Too Heavy Burdens of Orders

#### Washington

• • • "You have been asked to do the impossible before and now you are being asked to do it again," WPB Chairman J. A. Krug told a recent meeting of the Machine Tools Industry Advisory Committee where means were considered to produce tools for both war needs and reconversion.

Members of the committee said that the industry had already received many orders for bottleneck items of equipment necessary for reconversion and asked that tool companies be placed on the national production urgency list and given every possible assistance in obtaining manpower and materials.

Mr. Krug told the committee that the industry would have WPB's fullest support and cooperation, after industry members informed him that they were not optimistic about the chances of increasing output at this time. They said that production cannot be expected to rise above March deliveries which were about \$39,000,000.

Need for forging presses and other bottleneck items will retard reconversion to peacetime production just as they earlier held back war production if the industry's need for skilled manpower is not shortly solved, committee members declared. They emphasized that the need for building up working forces must be met now if tools are to be available for reconversion when needed and pointed out that the long production cycle of many items is the reason for this.

Committeemen reported that expanded production would be endangered through withdrawal of material allotments following cancellation of December artillery munitions programs. They were told that interim applications for materials necessary to maintain machine tool production for other needs would be favorably considered within the limits of material available.

WPB officials told the meeting that industry might expect in the near future some relief from demands for new machines through the release of surplus government equipment. The remodeling of surplus tools to meet foreign requirements was discussed but the toolmen said that they felt that a broad program to this effect would be impractical so long as the demands for new machinery required full capacity of the plants.

### Aluminum Lifeboats Approved for Ships

#### Washington

• • • Weighing considerably less than a wooden one and approximately half that of a steel one of the same cubic capacity, a new aluminum lifeboat, has been approved for installation on American ships. It is resistant to the action of the various corrosive agents found at sea, the Coast Guard says, and, because of its lighter weight materially reduces the weight installed on upper decks, thereby favorably affecting the stability of the vessel.

Additional weight may be saved on upper decks in the circumstance that a lighter davit may be employed to handle the aluminum boat.

Aluminum lifeboats are not new, for the material was used experimentally by one steamship company, who installed a number of aluminum lifeboats on a ship of its fleet in 1938, with satisfactory results.

The Wage Scale

Months	0	1	2	3	4	5	6	7	8	9	10	11
Grade												
1	0.85	0.87	0.89	0.91	0.93	0.95	0.97	0.99	1.01	1.03	1.04	1.05
2	0.84	0.86	0.88	0.90	0.92	0.94	0.96	0.98	1.00	1.01	1.02	
3	0.83	0.85	0.87	0.89	0.91	0.93	0.95	0.97	0.99			
4	0.81	0.84	0.86	0.88	0.90	0.92	0.94	0.96				
5	0.79	0.82	0.85	0.87	0.89	0.91	0.93					
6	0.77	0.80	0.82	0.84	0.86	0.88	0.90					
7	0.75	0.78	0.81	0.83	0.85	0.87						
8	0.73	0.76	0.78	0.80	0.82	0.84						
9	0.71	0.74	0.77	0.79	0.81							
10	0.69	0.72	0.75	0.78								
11	0.67	0.70	0.73	0.75								
12	0.65	0.69	0.72									
13	0.62	0.66	0.69									
14	0.62	0.66										
Female	0.57	0.60	0.66									



## Controls Relaxation to Cover Transition and VJ-Day Phases of War

### Washington

• • • The way WPB controls will be dropped depends upon the declaration of VE-Day by the President, WPB's Committee on Period One says.

With VE-Day proclaimed on May 8 the transition period should end on Dec. 31. During the transition period, all outstanding ratings in the AA series should remain valid except the AA-T rating, which should be abolished at VE-Day. Military procurement not already rated AA-1 may be uprated to MM during this period until T-Day. (T-Day signifies the date of termination of the transition period.) MM ratings should be equivalent to AA-Q AA-1 ratings and CC ratings (if any equivalent to AA-W ratings). AAA ratings should be maintained for the duration of the war under established procedures and be superior to MM-Ratings.

The following controls will be dropped immediately:

1. Percentage of controlled material allotments above military allotments when CMP is open-ended.
2. Most orders prohibiting or orders prohibiting or limiting civilian production.

3. Individual items from scheduling control. (M-293, etc.)

4. Distribution of control restrictions of controlled materials contained in priorities regulation No. 13 and removal of restrictions affecting controlled materials from the regulation.

5. Spot authorization, provided in Priorities Regulation No. 25, as it relates to "chinking-in" production.

6. AA-5 Priorities, Orders bearing this rating would be considered unrated after VE-Day.

7. Manpower limits, quantity checks and display limitations from the experimental model orders P-43 and priorities regulation No. 23.

8. Scarce material orders to be rationed for the rest of the country but relaxed in areas where unemployment problems are anticipated.

9. CMP regulation No. 1, paragraphs (U) requiring debiting against allotment accounts surplus materials acquired under priorities regulation 13. Paragraphs (U) and (V) should be amended to bring controlled materials under the provisions of Priorities Regulation 1.

10. Rating floors will be removed where production and delivery will not interfere with rated orders.

11. General Program Order 5-10 to permit a freer transfer of production lines from military to non-military output.

WPB controls to be maintained between VE-Day and end of transition period Dec. 31:

1. CMP open-ended, AAA priorities and AA priorities except AA-5. CMP will not be open-ended until July 1, although orders may be accepted in anticipation of that date.

2. Less than 200 orders governing the production, distribution or use of materials expected to be in short supply. Among metals WPB expects will be in short supply are: tin, lead, chrome, nickel, columbium, chemical, textile, lumber and pulp allocation orders are expected to be retained.

3. Simplification and standardization orders required to increase production of items in short supply.

4. "P" and "U" orders granting maintenance, repair and operating or other special rating assistance.

5. The basic steel order M-21 which has been revised to include all restrictions on steel production and warehousing.

WPB says no restrictions should be imposed on steel warehouses prohibiting them from filling unrated orders, although it may be desirable to limit the volume of warehouse purchases per consumer for particularly tight products.

"It is felt that, if steel is tight during the transition period, the warehouses will themselves protect their stocks against undue drain on unrated orders, since such orders would carry no replacement privileges at the mills. At VE-Day steel warehouse replacements with CMP allotments should be limited to their sales of similar products against CMP orders.

"For copper and brass mill product warehouses, on the other hand it is proposed that unrated sales be permitted to the extent of 10 per cent of their unrated sales plus subsequent unrated receipts. It is also proposed to retain the 3000 lb. per month limit on any consumer's purchases, both rated and unrated, from warehouses.

"In the case of aluminum, it is felt that supplies will be sufficiently free to make unnecessary any restrictions on unrated warehouse sales."

6. Machine tool order E-1-B.

7. Orders governing the production of automobiles and trucks, steel cars, motor buses and trolley coaches.

8. Steel production directive system and the general power to direct metals production.

9. Production scheduling (M-293) with some items removed. Emphasis will be on solving individual plant difficulties than on industry wide action. Scheduling may be exercised with respect to any production, in whole or in part, or to any manufacturer or plant at any time. WPB may direct allocation of specific percentages of a manufacturer's output for particular purposes.

10. Inventory controls, section 944.11 of Priorities Regulation 1 and CMP Regulation 2 prohibiting greater than a 60-day inventory.

11. Priorities Regulation No. 1, section 944.1 governing the use and distribution of materials acquired with priorities assistance and prohibiting their use for any purpose other than the one for which assistance was given.

11a. General import and export shipping controls, removing from control individual items as soon as shipping and supply conditions permit. Subsidization of supplies to continue so long as needed. Stockpile levels should be revised and modified on a continuing basis as circumstances change.

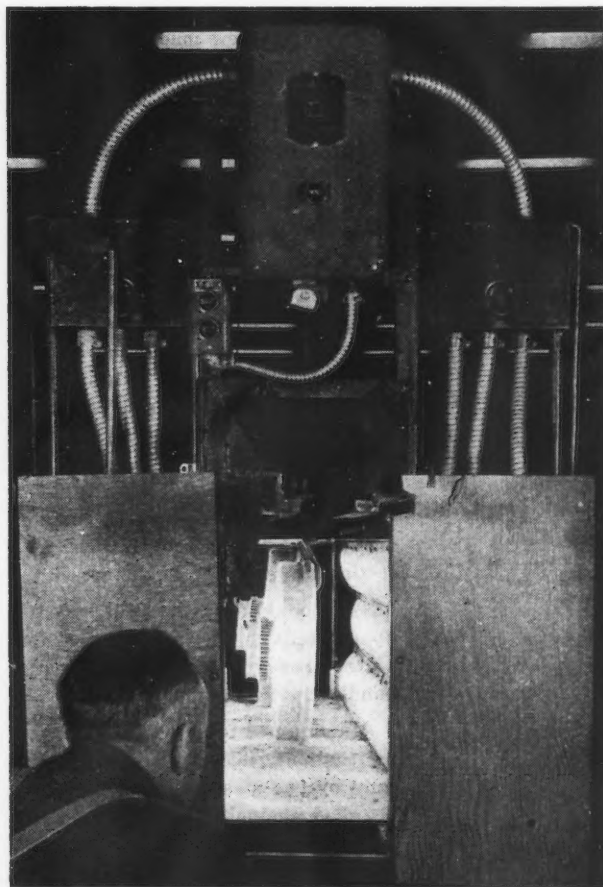
12. Spot authorization plan, Priorities Regulation 25, to grant relief from remaining limitations of WPB orders where resources are available. It is to be simplified. Major production restrictions involving very heavy potential materials consumption should be withheld from the local "spot" exception.

13. Programming of both military and civilian production.

14. Prohibition of trial production runs and distribution of samples contained in orders P-43 and Priorities Regulation 23.

15. Rationing controls over refrigerators, automobiles, trucks, motor cycles, stoves, gasoline, kerosene, fuel oil, naphtha, rubber tires, street cars, trolley coaches, buses, leather shoes and rubber footwear.

Refrigerators and automobiles are to remain under rationing until car production approaches 100,000 a quar-



**INFRA-RED HEATING** — An infra-red lamp bank, similar in miniature to those used in the quick-drying of automobile body paint, has been introduced by Studebaker to make possible zero fits with aircraft engine reduction driving gears. In operation near the beginning of the assembly line, the tunnel-like oven heats the part to 500 deg. This expands the gear so that it can be installed on the crankshaft. On cooling, the metal shrinks to its normal size. Previously a hot oil bath expanded the reduction driving gears. The new process is more efficient, more economical and eliminates the noxious odor of the hot oil. With the oil dip, four pairs of asbestos gloves were required daily. The same number of gloves will last two weeks with the dry heating method.

## Reciprocal Tariff Act Extension Meeting Powerful Opposition From League

### Washington

• • • With opposition coming principally from the American Tariff League, representing a wide range of manufacturers and from metal mining interests, hearings before the House Committee on Ways and Means on the bill for a three-year extension of the Reciprocal Tariff act probably will be concluded at the end of the present week. There were few individual manufacturers who appeared before the committee to oppose the measure and none from the iron and steel industry. Absence of such appearances was attributed to several factors.

One is that reliance was placed on the league's testimony. Another is the fact that in the immediate postwar period production in devastated European countries will be applied principally to rehabilitation with the prospects of only small amounts of manufactured imports in this country which in turn will be by far the greatest exporting country. Also there is a group that has no particular concern over the act as it now stands, and evidently doubts that the added provision authorizing reduction in rates up to 75 per cent of those in effect in 1934 will be approved by Congress. Rather they believe the law will be extended in its present form which restricts reductions to 50 per cent of the original rates. Many such reductions have been made in iron and steel rates.

Mining interests, however, have vigorously protested to the committee against the bill provisions extending the act for three years and authorizing reductions of 50 per cent of rates existing on Jan. 1, 1945—or 75 per cent of the original rates that have been slashed 50 per cent.

The American Manganese Producers' Association, through its president, J. Carson Adkerson, went further in its protestations. It asked for restoration of the manganese ore duty of one cent per pound metallic manganese content on ore containing 10 per cent or more manganese which was provided in the Tariff Act of 1930. This duty was subsequently reduced to  $\frac{1}{2}$  c. per lb. under a Reciprocal Tariff agreement. Mr. Adkerson said that, "It is generally recognized that the State Department made a mistake in reducing the duty on manganese ore

and we hope some way will be found to rectify it before the cutbacks after the war." He added that restoration of the one cent per pound duty was necessary to insure continued development of the domestic manganese deposits in the postwar period.

Citing the domestic manganese industry's war record, Mr. Adkerson said that since 1940, with the war in Europe and the beginning of the stockpiling program, producers in the United States have supplied the war effort 757,432 tons of high grade—35 per cent and more manganese—and around 2,000,000 tons of low grade ore—10 to 35 per cent manganese. This was done, Mr. Adkerson declared, during the war years when top officials in the war agencies were saying that they were getting not only every ton but every pound of manganese ore available in the world. During the war, he said, the United States consumes over 1,300,000 gross tons of high grade manganese ore per year while in prewar years the average consumption was around 800,000 tons.

"Under the treaty of 1902 there is no duty on Cuban ore," Mr. Adkerson said. "The American tariff stimulated developments in Cuba as well as in the United States.

"Since 1940 Cuba produced and shipped into the United States a total of more than 1,000,000 tons of high grade manganese ore, making a total of more than 1,757,000 tons of high grade ore from the United States and Cuba combined.

"Without this tonnage from the United States and Cuban sources during the war years the situation in manganese would have reached the point of alarming shortage."

### Pontiac Begins Rocket Output

Pontiac, Mich.

• • • Pontiac Motor Division has gone into production on five-inch high-velocity assault rockets for the Navy, having tooled for this job since early this year, following completion of an Oerlikon gun contract on Dec. 31.

Pontiac produces the entire rocket with the exception of the nose fuse and explosive charge. Released from Navy planes, the rockets are said to have the approximate fire power of five-inch shells.

ter and icebox output reaches 10,000 units a quarter. At this point full rationing will be abandoned but deliveries to uses in the highest urgency classes should if necessary be aided by priorities.

Miscellaneous electric appliances such as washing machines, electric ranges, electric fans, sewing machines and vacuum cleaners will not be rationed. Rationing should not be applied to any items now out of production which have not been previously rationed during the war.

### WPB controls to be dropped on T-Day (Dec. 31):

1. CMP.
2. AA priorities.
3. Non-war programming.
4. Distribution controls except where clearly necessary to prevent genuine and widespread hardship.
5. Construction controls relaxed gradually by expansion of the dollar limit exemptions, relaxations of standards for approval in Order L-41.
6. Export controls except where it can be reasonably demonstrated that special conditions might threaten the maintenance of adequate civilian supplies or seriously hamper orderly reconversion through undue exports.
7. Blanket assignment of preference ratings for MOR.
8. Any material or rationing orders where supply permits revocation.

### WPB controls to be maintained until VJ-Day:

1. "MM" priorities.
2. "CC" priorities.
3. Orders governing the production, distribution or use of materials in short supply.
4. Simplification and standardization orders required to increase the production of items in short supply.
5. Power to direct the production of metals, Priorities Regulation 1.
6. Production scheduling (M-293) with some items removed.
7. Inventory regulation, Priorities Regulation 1.
8. General import and export shipping controls, subsidy of supplies to continue so long as needed. Stockpiling levels should be revised, on a continuous basis as circumstances change.
9. Construction controls to be relaxed gradually by expansion of the dollar limit exemptions, relaxation of standards for approval in modifications of order L-RQM.
10. Export controls where it can be reasonably demonstrated that special conditions might threaten the maintenance of adequate civilian supplies or seriously hamper orderly reconversion through undue exports.

### Beckham Takes Labor Position

#### Washington

• • • John L. Beckham, Oklahoma City, Okla., has been appointed WPB acting vice-chairman for labor production to serve during the absence of Vice-Chairman Joseph D. Keenan, who has been loaned to the War Department for an assignment in United States-occupied Germany. Mr. Beckham had been the chief regional labor representative and assistant to the regional director for WPB in Dallas, Texas, since 1943.



## Bomb Effects on German Steel Told

### Washington

• • • How American and British bombing smashed iron and steel production in Germany is graphically told in a joint statement by the United States Strategic Air Forces in Europe and the British Air Ministry. Pointing out that even before the last air battle of the Ruhr, the district had ceased to provide raw materials for factories throughout Germany, the statement said that stocks of coal piled up in the Ruhr and could not be moved.

"Production of iron and steel by the Vereinigte Stahlwerke, the biggest steel combine in Germany whose numerous works produced 50 per cent of all iron and steel coming from the Ruhr, fell from 502,350 tons of iron and 624,342 tons of steel in August, 1944, to 151,548 tons of iron and 161,552 tons of steel in January, 1945," the statement said. "The only military purpose which its ruins could serve was as a fortification for a trapped army, and even for this purpose they do not seem to have been of much use."

### Spot Authorization Applications Go Up Nearly 50 Per Cent

#### Chicago

• • • Applications for spot authorizations to undertake civilian production have increased about 50 per cent to the regional War Production Board office here since the April 27 an-

nouncement by J. A. Krug, WPB chairman, restoring complete operation of the spot authorization plan in critical labor areas.

Despite the bulge in applications, local WPB officials, after consulting with War Manpower Commission, still are believed to hold the view that labor stringency in the immediate Chicago area still is so severe in critical war industries, that non-

essential civilian production should not be encouraged.

Many of the industrial areas in this region have large manufacturing facilities normally devoted to manufacture of farm and railroad equipment, both of which have been handicapped by lack of material. It is believed likely that every effort will be made to get these industries restored to full operation before attention is given to less necessary products.

In his announcement of restoration of the spot authorization, Krug pointed out that the Controlled Materials Plan will be "open ended" when conditions permit, with the result that the spot procedure will become less important as a mechanism for authorizing civilian goods output. This ties in with the belief that as much head start as possible will be given industries regarded as essential by means of CMP allotments and labor priorities, with other industries filtered into the production stream by the same means as conditions permit.

### WPB Clarifies Steel Directive Procedure

#### Washington

• • • WPB on May 1 said that an impression is current that it is necessary for a person to have first placed an order and have it accepted by a steel producer before requesting a directive. This is not necessary and results in considerable confusion in the mills and a mix-up as to allotments.

Consequently, WPB issued interpretation No. 29 to CMP Regulation 1, to explain this misunderstanding and to point out that consumers must not use later quarter allotments to support authorized material orders when they also intend to request a directive to have the order advanced to an earlier quarter.

For instance, the interpretation says, from time to time persons who require delivery of steel in the second quarter have placed controlled material orders against fourth quarter allotments asking for delivery during the fourth quarter and then have requested WPB for a directive to get delivery in the second quarter.

WPB will then issue a directive requiring the acceptance and delivery of the order in a proper case whether the individual has been able to get the order accepted for a later quarter. Directive assistance should be requested immediately through proper channels.

## MACHINED BRONZE BEARINGS GRAPHITED AND OILLESS BRONZE BEARINGS BRONZE GEAR BLANKS MACHINED BRONZE PARTS

S & H Bronze Bearings are made of cast bronze, under the most modern conditions and of specifications to meet the most exacting requirements. We are manufacturers of plain bronze and graphited and oilless bronze bearings for all branches of the Government Services, as well as plain cylinder type, single and double flange, thrust washers, from  $\frac{3}{8}$ " in diameter to 20" in diameter. We also manufacture special parts made of cast bronze. Our manufacturing methods and equipment enable us to meet the most exacting machining specifications.

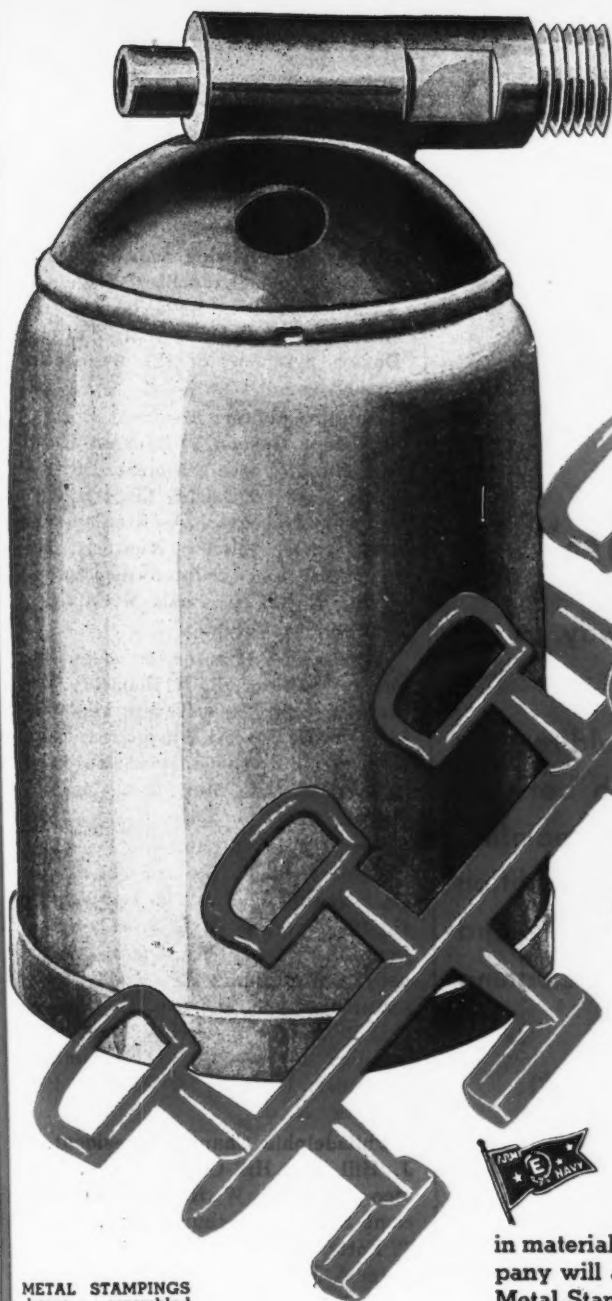
*If it's Bronze*  
**INDUSTRIAL**



*We make it*  
**BEARINGS**

**S. & H. Bearing and Manufacturing Co.**  
340-344 North Avenue, East  
Cranford New Jersey





*Complete service*

**PLASTIC MOLDING  
METAL STAMPING  
PLASTIC *with* METAL**



This unique service combination is ready to serve you. Our alert and experienced engineering and designing staff are abreast of today's rapid changes in materials and production methods. The Metal Specialty Company will assist you in any developmental problems relative to Metal Stamping or Plastic Molding.

**METAL STAMPINGS**  
drawn — assembled  
— hydrogen brazed.  
Sizes up to 15"

**PLASTIC  
MOLDING**  
injection. Jewelry  
application.

**OUR PLASTIC DIVISION . . .** furnishes custom molding in all thermoplastics from a fraction of an ounce up to 18 ounces per shot.

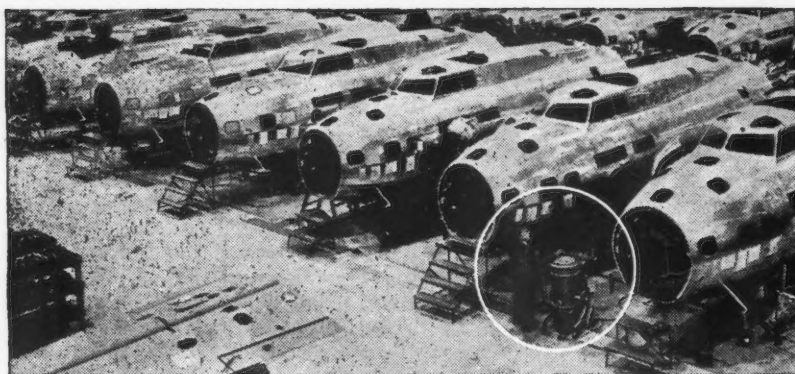
**OUR METAL DIVISION . . .** fabricates in all heavy and new light metals. Drawing, Coining, Stamping, Welding, Rolling, Forming.

**THE METAL SPECIALTY CO**

**PLASTIC MOLDING  
METAL STAMPING**

**ESTE AVE. • CINCINNATI 32 • OHIO**

BRANCH PLANT — SOUTH L ST., RICHMOND, IND.  
SALES OFFICE — W GRAND BLVD., DETROIT, MICH.



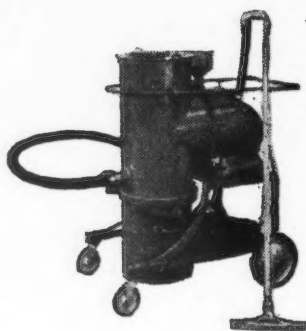
## BIG BUSINESS

*with a little* **SPENCER VACUUM**

Properly applied, a little vacuum goes a long way, as you can see from the above illustration.

What would it mean to your plant if you could remove all chips, rivets, sawdust or dirt from the job between each operation? Users say that cleaning before painting alone saves the cost of a Spencer Vacuum. In addition the same machine can reclaim materials, improve fire and health hazards, move materials and save time in cleaning machinery, floors, walls and ceilings.

Spencers range in size from the  $\frac{3}{4}$  and  $1\frac{1}{2}$  horsepower portable shown to the large stationary systems which can be piped to any part of the plant. Vacuum tools are provided for every kind of service, and for every kind of material from lead to liquids and from lint to the finest powders. Ask for the bulletins.



*Also for*

**HULLS  
WINGS  
INSTRUMENTS  
TANKS  
AND  
SERVICING**

# SPENCER VACUUM

HARTFORD

## CLEANING

THE SPENCER TURBINE COMPANY, HARTFORD 6, CONN.

### NEWS OF INDUSTRY

## Steel Warehouse Group Elects New Officers For Eastern Chapters

### Cleveland

• • • The following additional chapters of the American Steel Warehouse Association, Inc., have been elected officers for the coming year, Walter S. Doxey, president of the association, announces:

**Buffalo Chapter:** President, Clarence S. Gedney, Joseph T. Ryerson & Son, Inc., Buffalo; vice-president, David C. Parks, Smith & Caffrey Co., Syracuse; secretary-treasurer, A. Stanley Vedder, Brace - Mueller - Huntley, Inc., Syracuse; and chapter director, J. Frederick Rogers, Beals McCarthy & Rogers, Inc., Buffalo.

**Connecticut Chapter:** President and chapter director, R. B. Shearer, C. S. Mersick & Co., New Haven; vice-president, S. H. Hascall, Blodgett & Clapp Co., Hartford; secretary-treasurer, G. S. Brouso, C. S. Mersick & Co., New Haven.

**New York Chapter:** President, Charles Kramer, U. S. Steel Supply Co., Newark, N. J.; vice-presidents, H. B. Royer, J & L Steel Service, Inc., Long Island City, and J. P. Donnelly, Atlas Supply Co., Inc., Bronx; secretary-treasurer, Wm. C. Hughes, Bright Steel Corp., New York; and chapter director, P. O. Grammer, Grammer, Dempsey & Hudson, Inc., Newark, N. J.

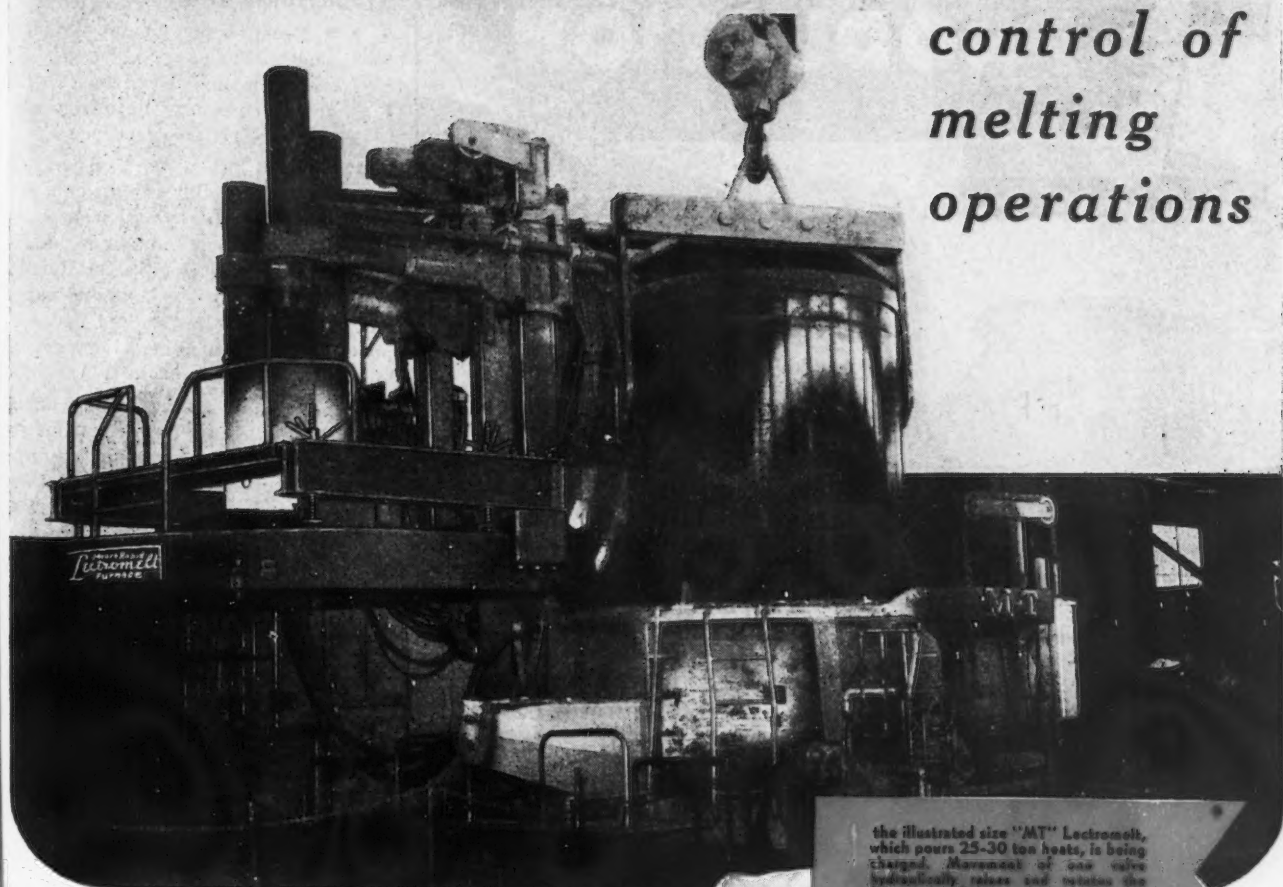
**Philadelphia Chapter:** President, J. J. Hill, Jr., Hill-Chase & Co., Inc.; vice-presidents, W. H. Franklin, Edgcomb Steel Co., Arthur Collins, Horace T. Potts Co., and John J. Drummond, Peter A. Frasse & Co., Inc.; secretary-treasurer, J. M. Mead, Joseph T. Ryerson & Son, Inc.; and chapter director, Leslie Edgcomb, Edgcomb Steel Co., all of Philadelphia.

**Pittsburgh Chapter:** President and chapter director, H. E. Williams, Williams & Co., Inc., Pittsburgh; vice-presidents, W. C. Shuck, Lockhart Iron & Steel Co., Pittsburgh, and Bennett Oliver, McKee-Oliver, Inc., Pittsburgh; secretary, T. L. Lawry, Steel Products Co., McKees Rocks; and treasurer, F. B. Lorenz, Edgar T. Ward's Sons Co., Pittsburgh.

**Washington Chapter:** President, Harold Barde, Barde Steel Co., Seattle, vice-president, Arnold S. Allen, Seattle Hardware Co., Seattle; secretary-treasurer, W. R. Case, Seattle Steel Co., Seattle; and chapter director, Carrol Richards, Hunt & Motet Co., Tacoma.

MOORE-RAPID  
*Lectromelt*  
FURNACES

... permit closer  
control of  
melting  
operations



the illustrated size "MT" Lectromelt, which pours 25-30 ton heats, is being charged. Movement of one valve hydraulically raises and rotates the furnace roof to one side for this operation.

The precise control possible with the Moore Rapid Lectromelt Furnace in the melting of quality steels and irons offers many advantages to the user. It assures high quality metals and facilitates the ready duplication of desired compositions and properties in the metal. Large or small heats may be made or part of the heat tapped and the analysis of the remainder altered as desired.

With Lectromelt's top-charge feature, the roof is quickly raised and swung aside so the furnace can be charged by drop-bottom bucket. As a result, the charge is uniformly and properly deposited on the furnace hearth.

Our engineering department will welcome the opportunity of discussing your melting requirements with you. Write for details.



**LECTROMELT TOP-CHARGE FURNACES**  
... FROM 100 TONS DOWN TO 250 POUNDS

*Pittsburgh Lectromelt Furnace Corp.*  
PITTSBURGH 30, PENNA.



# designed to **SPEED PRODUCTION**



**Model  
11020-A**

## **RUTHMAN GUSHER COOLANT PUMPS**

Your need for high-speed production was uppermost in the minds of the designers of Ruthman Gusher Coolant Pumps. Sturdy construction . . . split-second control of coolants . . . high flushing capacity . . . simple, ball bearing design . . . no metal-to-metal contact means trouble-free operation and high-speed production on your machines.

With a Ruthman Gusher Coolant Pump you are assured of low maintenance cost and steady round-the-clock operation which will help you to meet your production schedules quickly, easily.

**THERE'S A GUSHER  
FOR EVERY  
REQUIREMENT**

**WRITE NOW FOR CATALOG**

## **THE RUTHMAN MACHINERY CO.**

**1821 READING ROAD CINCINNATI 2, OHIO**

**THE "GUSHER"**

**A MODERN PUMP FOR MODERN MACHINE TOOLS**

## **NEWS OF INDUSTRY**

### **Purnell Sees No Steel Reconversion Problem Following VE-Day**

**Youngstown, Ohio**

• • • Reconversion of the Youngstown Sheet & Tube Co. plants "is not a serious problem," President Frank Purnell told company shareholders at their 45th annual meeting recently.

Declaring that, "We feel certain there will be no difficulty in converting to peacetime production to meet the requirements of our trade as rapidly as they develop," Mr. Purnell pointed out that some maintenance and repair work has had to be postponed because of the shortage of materials and manpower.

Despite handicaps of acute labor shortages, Sheet & Tube has consistently broken all production records, Youngstown district plants working 1571 men seven-day weeks and 2500 16-hour days are being worked weekly.

First quarter operations were 106.1 per cent of capacity, as against 105.4 per cent for the first quarter of 1944 and 101.1 per cent for the 1943 first quarter. For the year, operations were 106.4 per cent.

### **War Materiel Output Tops \$1 Billion Mark**

**Cleveland**

• • • More than a billion dollars worth of war materiel, ranging from tank recovery units to detonator parts, was produced by Cleveland Ordnance District contractors during the first three months of 1945, according to the quarterly report of Col. E. A. Lynn, district chief.

First quarter production, highest in this district's history, amounted to \$1,089,000,000, more than two-and-one-half times the \$400,000,000 total of the same period one year ago and approximately one-third of the entire 1944 aggregate of \$3,257,700,366, the largest total the district has ever amassed. March production was 20 per cent over that of February.

Col. Lynn added that there are now 2567 prime contracts and purchase orders valued at \$2,502,363,502 under administration of Cleveland Ordnance District, of which 387, valued at \$257,476,000 were awarded during the past quarter. In order to utilize all possible productive effort, 168 of the new contracts valued at \$58,101,000, went to plants employing less than 500 persons and each of the new contracts was for \$10,000 or more.

blem  
E-Day

Youngs-  
"is not  
Frank  
lders at  
ently.  
certain  
convert-  
to meet  
as ra-  
Purnell  
tenance  
be post-  
age of

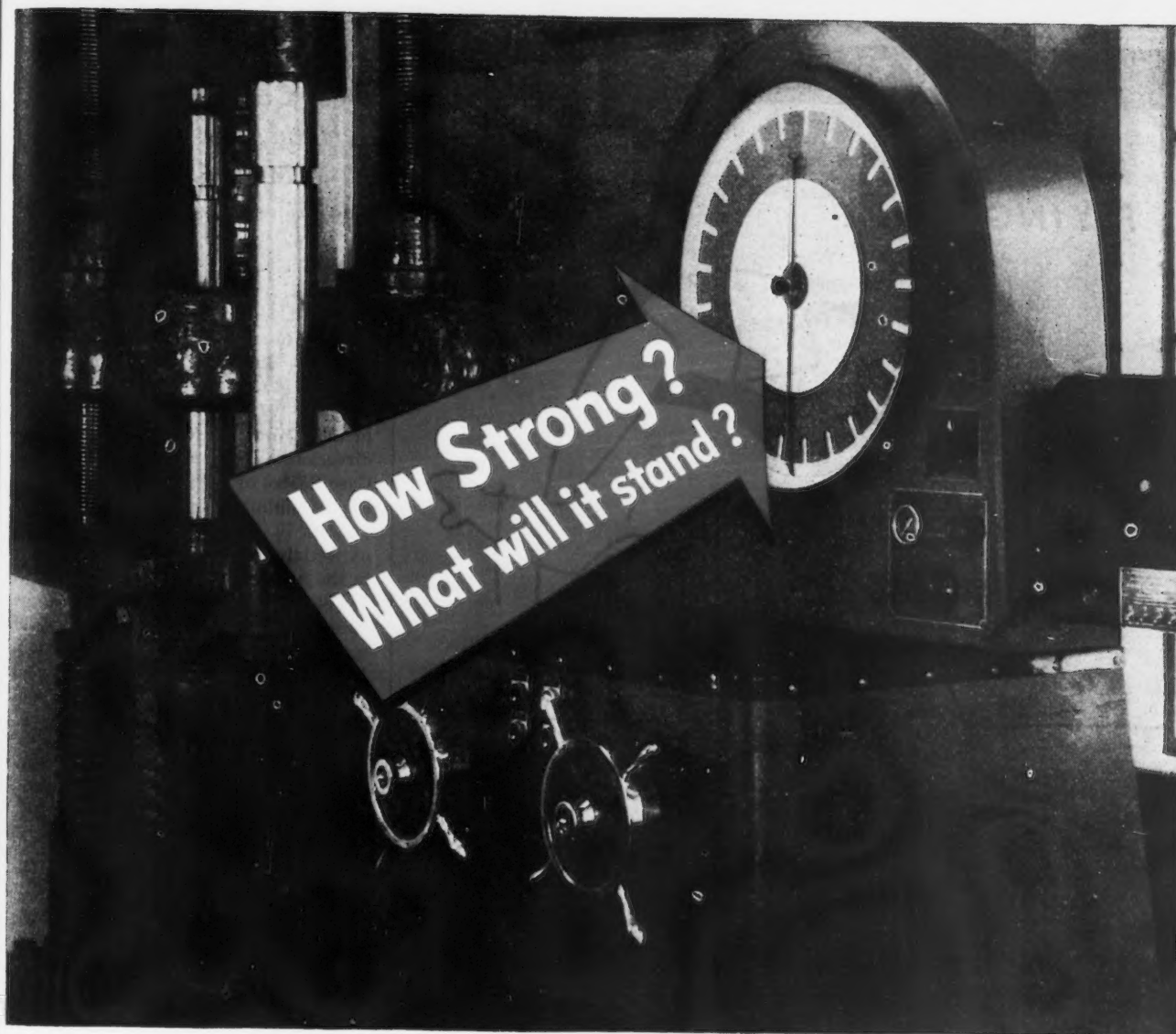
e labor  
consist-  
records,  
working  
nd 2500  
weekly.  
re 106.1  
st 105.4  
of 1944  
943 first  
erations

Mark

dollars  
ng from  
etonator  
and Ord-  
ring the  
ccording  
l. E. A.

ghest in  
anted to  
two-and  
00 total  
ago and  
ne entire  
366, the  
as ever  
was 20  
ary.

are now  
chase or  
2 under  
Ordinance  
at \$257,  
the past  
all pos-  
the new  
00, went  
han 500  
contracts



...it pays to

*Know!*

There's an absolute minimum of guesswork about the service qualities of steel castings produced by PSF. The tensile testing machine with stress-strain recorder, above, is only one evidence of the rigid laboratory control maintained over all PSF work, from the furnace on. That's your assurance of dependability. We want to know, and you must know!



47 YEARS OF STEEL CASTING KNOWLEDGE

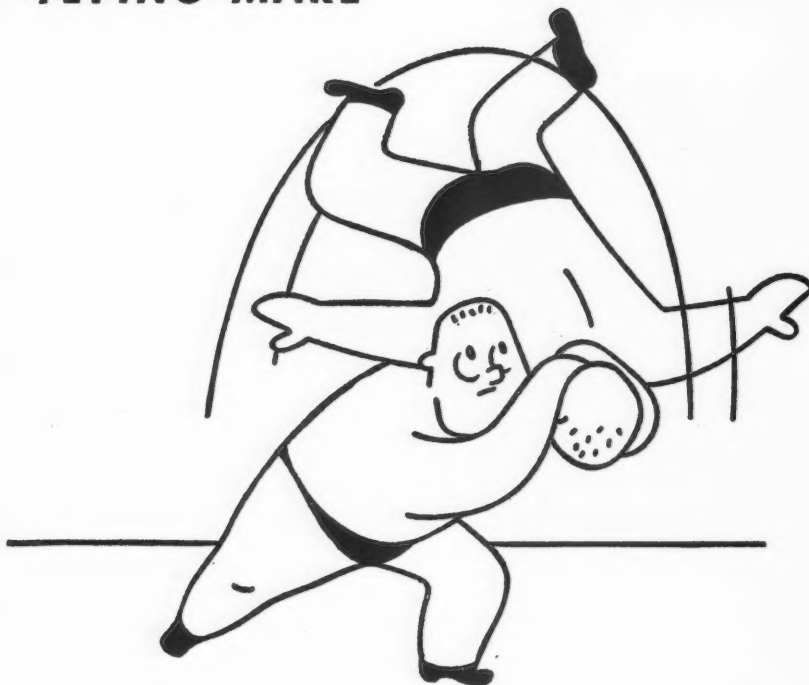
*Pittsburgh*  
**STEEL FOUNDRY CORPORATION**

GLASSPORT, PA.

Sales Offices: NEW YORK • PHILADELPHIA • WASHINGTON AND CHICAGO

THE IRON AGE, May 10, 1945—125

## FLYING MARE



Wrestlers, like the boys above, use resin to keep from slipping. More and more maintenance men and safety engineers are using SPEEDI-DRI to eliminate slipping and expensive, bone-breaking falls on oil-soaked, greasy floors.

Introduced three years ago, SPEEDI-DRI is now used nationwide by thousands of industrial plants wherever spilled oil or grease causes a safety problem on wood, concrete or composition floors.

Insurance companies recommend it.

SPEEDI-DRI is easy to use. Just spread a carpet on an oil-slick floor, and it immediately furnishes a sure, skid-proof surface. Sweep it up, and your floor is dry and safe.

No more accident worries. No more complicated, time-consuming, floor-cleaning equipment. No more dangerous cleaning chemicals. No more "fast-fire" hazards from oil soaked floors. SPEEDI-DRI for oils and greases, SOL-SPEEDI-DRI for resins, syrups, coolants, solvents and acids as well as oils and greases. Send for a free sample.

SUPPLIERS: East — Refiners Lubricating Co., New York 1, New York.

Midwest & South — Waverly Petroleum Products Co., Philadelphia 6, Pa.

West Coast — Waverly Petroleum Products Co., Russ Bldg., San Francisco 4, Calif.

**SPEEDI-DRI**  
OIL AND GREASE ABSORBENT



## Steel Co. of Canada Head Reports Progress Made in War Period

### Toronto

••• The board of directors of the Steel Co. of Canada Ltd. recently elected H. G. Hilton, executive vice-president to the presidency in succession to Ross H. McMaster, who takes over the duties of chairman of the board. Mr. Hilton joined the company in 1919 after some years spent in the United States in blast furnace direction. He is a graduate of the Case School of Applied Science, Cleveland, in mining engineering.

Ross H. McMaster, in his address as retiring president, reported that in the first quarter of 1945 steel ingot production was only slightly below the figures for the same period of 1944 in spite of the severe weather in early January, which seriously impeded operations. Dollar sales were somewhat higher due to the greater tonnage of purchased steel processed. Practically all departments continue to operate to the limits imposed by the amount of steel or labor available.

In the five years, 1940 to 1944, inclusive, the total output in tons of ingots of steel equalled the total for the preceding 14 years. For example, the blooming mill for 1388 days worked 95.5 per cent of the time or only one hour out of every 24 hr. for minor repairs.

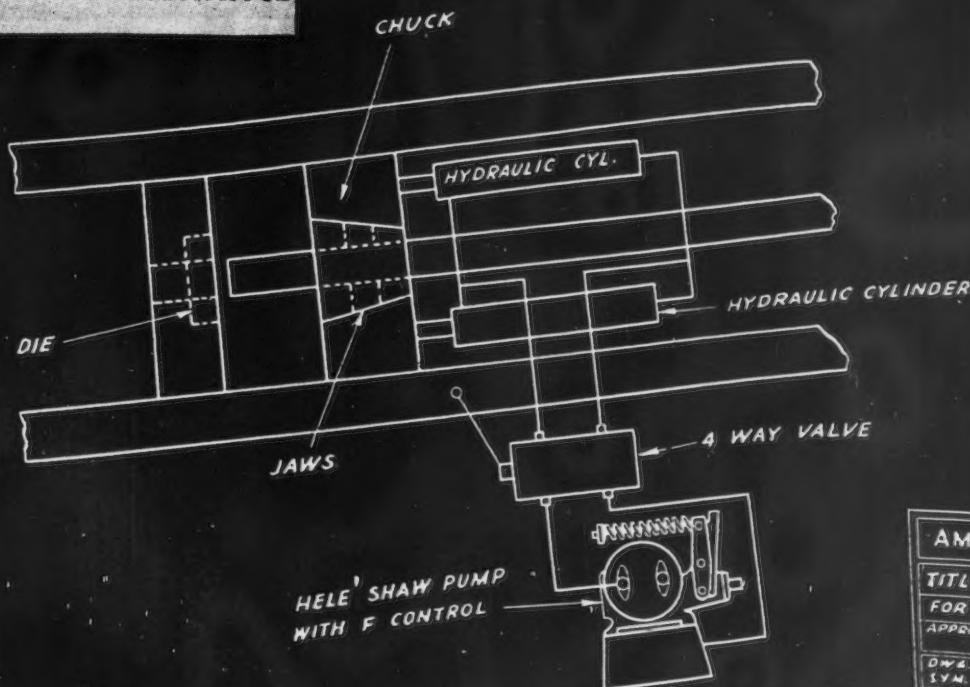
Work on the new hot strip mill progresses it was said. Cutbacks in war orders may free shop capacity soon and the cold reducing mills to complete the program may be started. The installation may be somewhat in advance of its time, but the steady growth in the consumption of flat rolled steel promises a load which will support economical operations, Mr. McMaster said.

Further plans to diversify the range of products are under advisement by the company as soon as postwar developments promise a satisfactory return upon the new investment. Encouragement is taken from the government enactment, recently passed, which allows additional depreciation deductions as a means of stimulating new construction, it was said. A later White Paper, regarding plans of the Reconstruction Department, gives hopes of the removal of some of the obstacles which now deter new undertakings. Mr. McMaster continued:

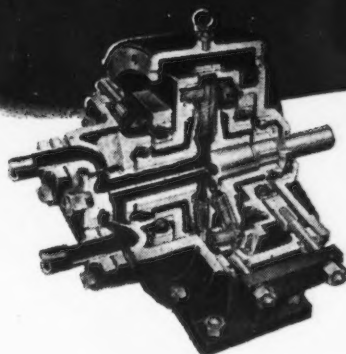
"It should be realized that Canada requires to import many types of spe-



**EVERY SHOVE  
BOOSTS PRODUCTION,  
LOWERS MAINTENANCE**



AMERICAN EN  
TITLE-DIAGRAM  
FOR - DRAW BE  
APPROVED  
DWA.  
SYM. 081334



THE HELE-SHAW

**Fluid Power  
PUMP**

OTHER A PRODUCTS:

A-TAYLOR AND PERFECT SPREAD STOKERS,  
MARINE DECK AUXILIARIES, LO-HED HOISTS  
DIAMOND FACE GRINDERS

## Hele-Shaw Fluid Power Furnishes Big Push on Draw Bench

**M**aintenance on the old draw bench got to be a headache. Wear and tear on the old worm gear and lead screw arrangement for pushing the bar through the die up to the puller was way overboard.

Casting about for a better method, the user hit upon Hele-Shaw Fluid Power (oil under pressure) . . . asked us to help out. With him, our engineers worked out a hydraulic device which not only filled the bill but saved maintenance, saved time and simplified operation. Now a pull of one small lever and the chuck rides up into position pushing the bar through the die. Another push and the jaw chuck returns.

Hele-Shaw Fluid Power is a means toward better, faster, smoother and safer operation in an amazing variety of hydraulic operations. Go hydraulic with the Hele-Shaw Pump and let Hele-Shaw engineers help you work out your application.



**AMERICAN ENGINEERING COMPANY**

Subsidiaries: COCHRANE CORPORATION, FARADAY ELECTRIC CORPORATION  
2433 ARAMINGO AVENUE, PHILADELPHIA 25, PA.

Copyright 1946, American Engineering Company

THE IRON AGE, May 10, 1945—127



A Sign of

*Reliable Service*

This R-S name plate on an industrial heat-treating furnace is more than a means of identification—it is the stamp of approval of R-S engineers.

It guarantees top notch production due to proper design, construction and operation.

It guarantees that the entire equipment is geared to individual plant conditions and the type of heat-treated product involved.

It assures minimum fuel consumption and the conservation of manual effort with maximum safety.

For heat-treating efficiency and economy, today or tomorrow, specify R-S Industrial Furnaces.

Consult with the nearest R-S District Office.

**R-S Products Corporation**  
631 Fisher Building  
Detroit 2, Michigan  
Phone—Trinity 2-2760

**W. R. McDonough & Co.**  
Cleveland Railway Bldg.  
Cleveland 14, Ohio  
Phone—Prospect 1940

**Haylett O'Neill**  
P. O. Box 1662  
Houston, Texas  
Phone—Hadley 9704

**A. Perry Roberts**  
Woolworth Bldg.  
New York 7, N. Y.  
Phone—Barclay 7-1245

**Harry M. Wood**  
800 Times-Star Tower  
Cincinnati 2, Ohio  
Phone—Cherry 2421

**S. P. Kinney**  
233 Oliver Avenue  
Pittsburgh, Pa.  
Phone—Atlantic 1790

**F. G. Dunbar & Son**  
53 W. Jackson Blvd.  
Chicago 4, Illinois  
Phone—Wabash 1104

**R-S Furnaces of Distinction**

FURNACE DIVISION  
**R-S PRODUCTS CORPORATION**

4524 Germantown Avenue • Philadelphia 44, Pa.

**BUY WAR BONDS**

cial machinery. On such equipment, not obtainable in this country, a duty of 10 per cent is levied, and in addition a war exchange tax of 10 per cent and a sales tax of 8 per cent, making a combined impost in Canadian currency of over 30 per cent. Considering that the government takes in taxes a minimum of 40 per cent as its share of industrial profits, these important additions to the initial cost of new equipment cannot avoid having a discouraging effect. The promise of future relief in the form of additional depreciation can hardly be expected to overcome these increases in the original cost.

"In the period of reconstruction following the war circumstances will warrant a sympathetic consideration from government of the problems of adjustment so that investment in new enterprise may be made with the fullest possible confidence. Based on the higher wage scales in effect today, the increased cost of new construction may easily deter new plant expenditures unless government policies tend to stimulate new ventures and the expansion of existing business.

"Unfavorable comparisons are frequently made between prices in Canada and elsewhere, unmindful of the basic fact that producers in this country are called upon to absorb higher taxes and assume the effects of higher costs of plant and equipment, due to the additional burdens the Canadian system of taxation imposes upon Canadian costs and prices.

"The increased cost of new plant equipment is a matter of prime importance to the steel industry for two reasons. First, the amount of plant investment related to annual turnover is much higher than in most other lines of business. Second, many important classes of steel are admitted into Canada entirely free of duty."

Against such time as tax adjustments are considered, Mr. McMaster made a special plea on behalf of income tax payers in the intermediate groups. He said:

"The abruptness with which the tax rates ascent imposes a heavy burden that has been borne by them with fortitude but not without sacrifice. The group most seriously affected includes many future leaders of business, now approaching the time when their talents, training and experience should be entitled to the reward due their greater capacity. The disparity between the Canadian and U. S. tax rates will be most discouraging to these on-coming Canadians unless a greater equality is established."

# Oakite Cleaning

HELPS EXPEDITE  
**BAZOOKA**  
PRODUCTION



... by **SPEEDING** Grease and Rust Removal,  
Surface Conditioning and Related Operations

**F**IRED by a two-man team, the bazooka's rocket-type projectile blasts through six inches of armor at 600 yards, tears the hide right off a 60-ton Tiger tank!

Here's another combination that does an effective job . . . Oakite materials *plus* complete, thorough Oakite methods! As a "team" they're helping expedite production of this sensational weapon by speeding cleaning and surface conditioning operations.

For example, the projectile's surface must be prepared for painting, must pass inspectors' severe tests for paint adhesion . . . smut must be removed from the interior of the launching tube before silver soldering and then the flux residue removed before painting.

All along the line Oakite cleaning materials and methods help save precious production minutes, help hold rejects to a minimum.

## Personal Advisory Service

Your nearby Oakite Technical Service Representative offers a wealth of **FREE** wartime experience with cleaning practically all types of Army and Navy materiel. Call in the Oakite Technical Service Representative—today—or write us direct, giving complete details, of your cleaning problem.

## Other War Products on Which Oakite Materials Are Used

Large & Small Caliber Shells • Bombs • Detonator Caps  
Airfield Landing Mats • Mortar Shells & Tubes  
Cartridge Clips • Powder Boxes • Machine Gun Barrels  
& Parts • Flare Bomb Cases • Burst Tubes • Shell Ogives  
Booster Caps • Fin Assemblies • Fuze Bodies & Parts  
Aircraft Engines & Parts • Tanks & Tank Destroyers  
Rockets & Tubes • Anti-Tank & Anti-Personnel Mines  
Communication Equipment

OAKITE PRODUCTS, INC., 14F THAMES STREET, NEW YORK 6, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

**OAKITE**

MATERIALS. METHODS. SERVICE.

Buy Bonds  
for  
Victory

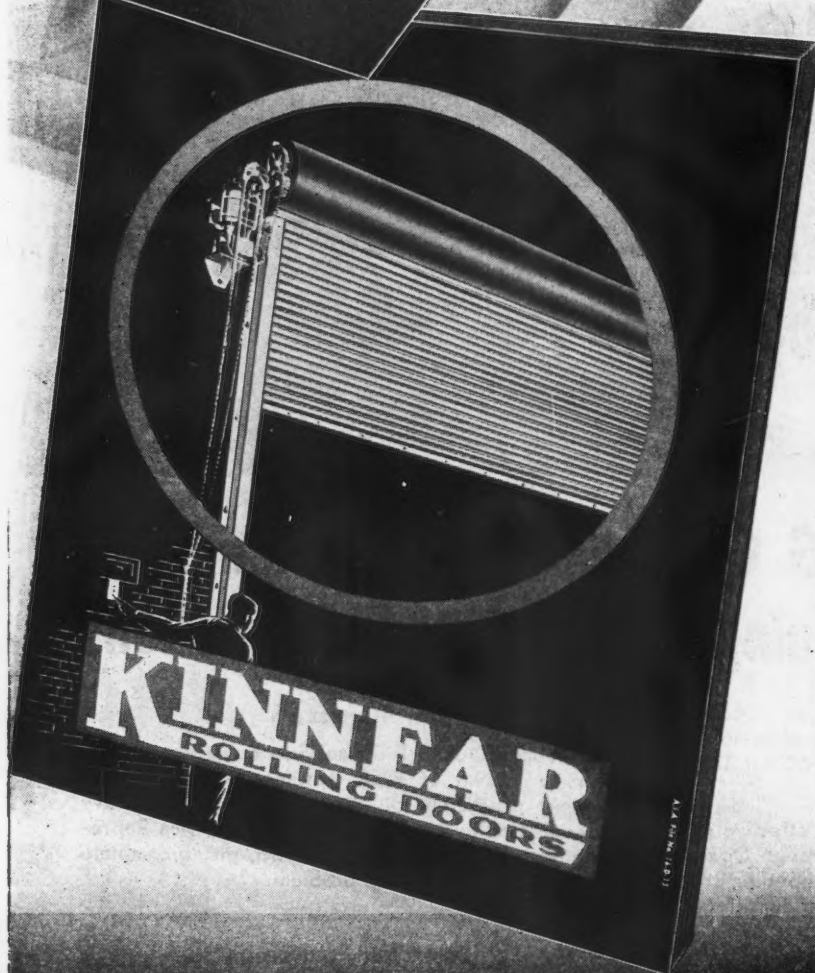
**CLEANING**

FOR EVERY CLEANING REQUIREMENT



**NEW**  
40 PAGES OF  
THE LATEST  
DOOR DATA

**SEND  
FOR  
YOUR  
COPY  
TODAY!**



Here it is, the NEW 1945 edition! Forty pages of complete information, graphically presented, on Kinneear upward acting doors for every purpose. It shows why Kinneear Doors are so widely preferred. Kinneear Rolling Doors feature a sturdy, flexible, interlocking steel-slat curtain and space-saving coiling upward action. Kinneear sectional type doors and other closures are also presented. Send for your FREE copy of this useful book today! Write to The Kinneear Mfg. Co. Factories: 1760-80 Fields Ave., Columbus 16, Ohio and 1742 Yosemite Ave., San Francisco 24, Calif.

Offices and Agents in Principal Cities

**SAVING WAYS  
IN DOORWAYS**

**KINNEEAR**  
ROLLING DOORS

## OPA Forms Machinery Advisory Committee

Washington

• • • The appointment of a Construction Machinery Manufacturers' Industry Advisory Committee was announced recently by the Office of Price Administration.

The new committee held its organization meeting in Washington, D. C., on May 1. Approximately 350 manufacturers of construction machinery were represented by the committee.

Members of the committee are: W. E. Miles, Oliver-Cletrac Co., Cleveland; Julian R. Steelman, Koehring Co., Milwaukee; R. K. Stiles, Austin-Western Co., Aurora, Ill.; W. J. Hazeltine, Buffalo, Springfield Roller Co., Springfield, Ohio; W. Blackie, Caterpillar Tractor Co., Peoria, Ill.; D. D. Kennedy, Foote Co., Inc., Nunda, N. Y.; D. M. Burgess, R. G. LeTourneau, Inc., Peoria, Ill.; Larry Glaser, Littleford Bros., Inc., Cincinnati; H. Gusman, Wooldridge Mfg. Co., Sunnyvale, Calif.; Paul B. Cochran, Buckeye Traction Ditcher Co., Findlay, Ohio; Kenneth Lindsay, Iowa Mfg. Co., Cedar Rapids, Iowa; R. W. Newberry, Bucyrus-Erie Co., South Milwaukee, Wis.; R. T. Harris, Blaw-Knox Co., Pittsburgh; W. B. Greene, Barber-Greene Co., Aurora, Ill.; George J. Dimond, Insley Mfg. Corp., Indianapolis; F. H. Moline, Pacific Car & Foundry Co., Seattle; E. F. Arming-ton, Euclid Road Machinery Co., Cleveland; and H. R. Meeker, J. D. Adams Co., Indianapolis.

## Continental Steel Corp. Quarterly Sales Increase

Kokomo, Ind.

• • • Although net sales for the first quarter of 1945 slightly exceeded those for the corresponding period of 1944, profit of Continental Steel Corp. dropped slightly compared with the 1944 period. Profits for the first quarter of 1945 were \$151,892.11, compared to \$155,805.71 for the first quarter of 1944. Net sales for the quarter just ended totalled \$5,983,755.39 compared with \$5,378,268.19 for the corresponding period of 1944.

In its quarterly report, the company points out that it makes no financial provision for adjustment of wage inequalities involved in the War Labor Board decision of Nov. 25, 1944, as it does not feel that any exist.

tee

struc-  
' In-  
as an-  
Price

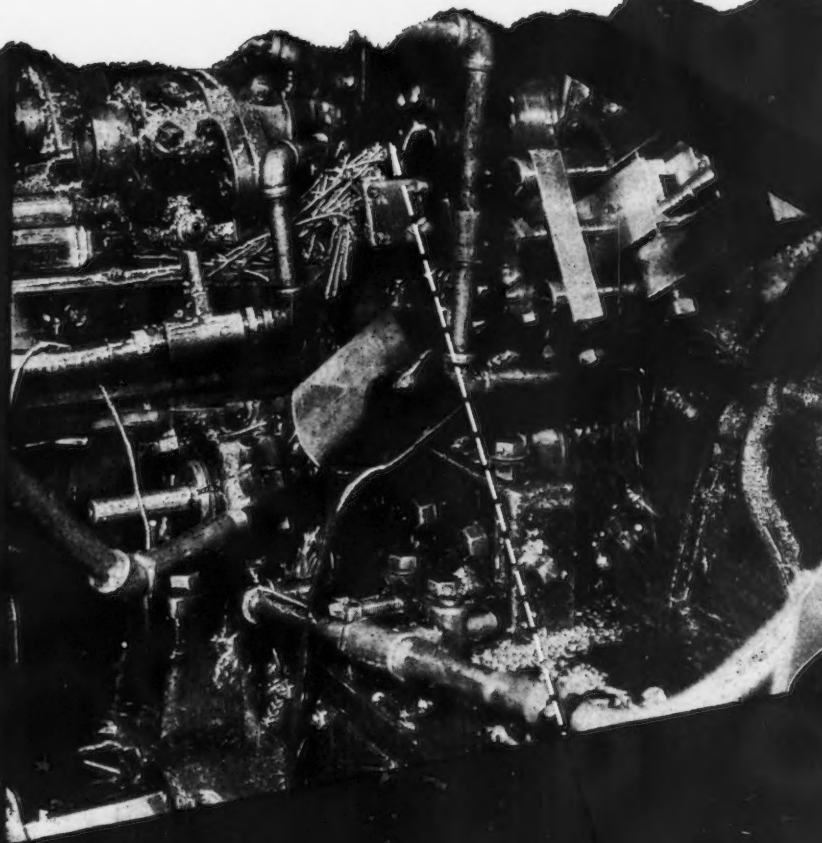
organ-  
D. C.,  
manu-  
hinery  
ctee.

re: W.  
Cleve-  
ehring  
ustin-  
W. J.  
Roller  
lackie,  
a, Ill.;  
Nunda,  
eTour-  
Glaser,  
ti; H.  
Sunny-  
uckeye  
Ohio;  
Co.,  
berry,  
aukee,  
x Co.,  
arber-  
erge J.  
diana-  
Car &  
rming-  
Co.,  
J. D.

e first  
those  
1944,  
Corp.  
h the  
quar-  
com-  
quar-  
quar-  
755.39  
or the

pany  
ancial  
wage  
Labor  
, as it

"THE PURPOSE OF ANNEALING MAY BE; (f) TO PRODUCE  
A DEFINITE MICROSTRUCTURE"  
NATIONAL METALS HANDBOOK



The operator working with annealed steel will avoid the usual "may" from his customer. The results he can obtain in his machining operations are to a great degree dependent on the structure of the steel and his knowledge that he's much concerned with annealing.

Wyckoff's Structure Controlled Annealing reduces variations in machining results by establishing a uniform satisfactory structure. The elimination of structural variations permits replacement of machining operations to improve efficiency.

## WYCKOFF STEEL COMPANY

First Nat. Bank Bldg., P.O. 20, Pa. - 3120 S. Wabash Ave., Chicago 23, Ill.

Wheat, Arkansas, Penna.; Chicago, Ill.; Newark, N. J.; Putnam, Conn.

Manufacturers of Carbon and Alloy Steels ... Turned and Patterned Shapes ...

Ing ... Turned and Ground Shafts ... Wide Flange Beams ...

COMPLETE ANNEALING AND HEAT TREATING FACILITIES



better selling FUNCTIONAL DESIGN

better looking *Decorative Beauty*

better performing Engineered Production

...for your postwar  
metal product!

To meet the intensive competition of peacetime selling, let GRAMMES give your metal products the *extra selling* features of eye-appealing functional design, decorative beauty of color and finish, and the dependability of engineered performance. Our designers and engineers can NOW develop your blueprints and ideas for a new product or improve your old product.

Since 1875, GRAMMES has specialized in the creation and manufacture of metal products in volume quantities for the radio, automotive, refrigeration, electrical, giftware, toy and other key

industries. Recent accomplishments in postwar product development and improvements for diverse nationally-known products indicate the completeness and versatility of GRAMMES centralized facilities and services.

With two "E" awards, we're producing for Victory, but our Contract Service offers Research, Design and Engineering aid NOW. Improved production techniques and increased plant facilities enable us to handle a few additional accounts requiring volume production for eventual postwar manufacturing. Address our nearest office.

#### GRAMMES FACILITIES INCLUDE

Stamping, Drawing, Spinning, Etching, Embossing, Lithographing, Enameling, French-fired Enameling, Plating, Spraying, Wire Forming, Drilling, Welding, Machining, Heat Treating, Anodizing (Alumilite), Tools & Dies and Line Assembly.

Send for booklet describing "Contract Service by Grammes"

*Grammes*

MASTER CRAFTSMEN IN METAL... SINCE 1875

L. F. GRAMMES & SONS, INC.

45 Union St., Allentown, Pa.

NEW YORK • CHICAGO • DETROIT • CLEVELAND • MILWAUKEE • PHILADELPHIA

132—THE IRON AGE, May 10, 1945

#### NEWS OF INDUSTRY

### War Controls Rigid Once Again in Canada Following Trends Here

#### Toronto

••• The reversal of Canadian governmental policy in regard to the relaxation of wartime materials controls was explained recently by J. Gerald Godsoe, chairman of Wartime Industries Control Board, and co-ordinator of controls, Department of Munitions and Supply in reviewing the operations of his department.

He pointed out that four basic principles guide the policies of the Canadian Government in regard to the continuation of such controls. These policies follow:

1. Controls over materials and services are identified with scarcity. These controls will be removed, as they have been removed, once supplies are adequate. They were created as a means of mobilizing our resources for war production and for no other purpose.

2. With the defeat of Germany, following the policy above outlined, all controls, save those essential to our participation in the Pacific War and to ensure essentially required civilian supplies, will be removed immediately as supplies justify.

3. The removal of controls will not ensure priority in materials or labor for the production of the goods involved. Industry will be left with the freedom of action that it had before the war.

4. Construction permits are now being granted for certain types of industrial projects of a postwar nature, particularly those identified with our export markets. This will enable industry to lay its plans for the future, to place its orders now for the equipment and material involved for later delivery, and, so far as supplies warrant, to get started in a modest way on its reconstruction program.

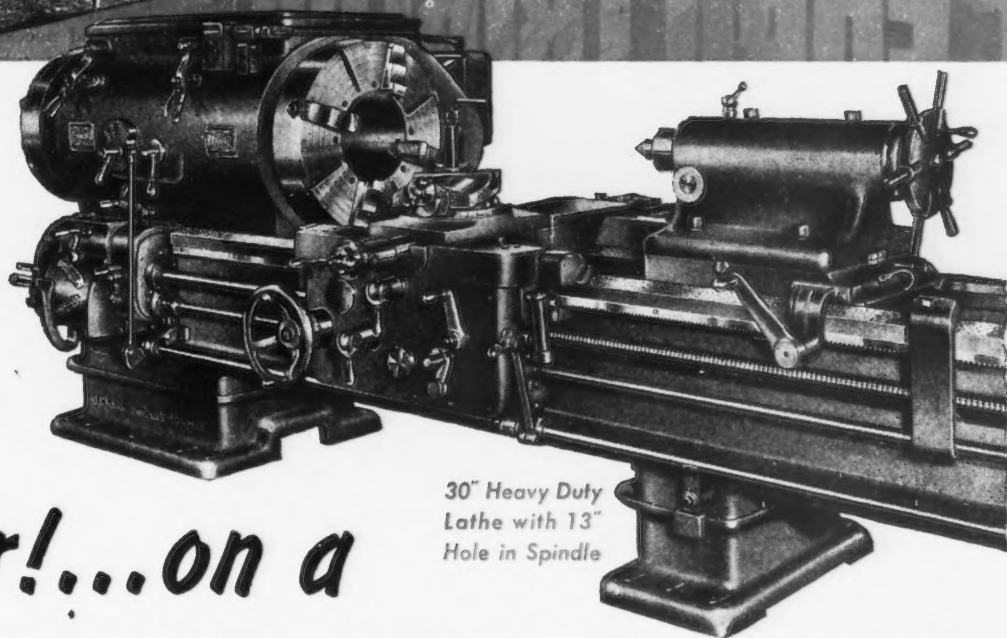
Broadly speaking, these are the controls over basic materials and services essential to the Canadian war program and are focalized within the Wartime Industries Control Board. The chairman of this board is also co-ordinator of controls and the following controls are identified with the board—chemicals, coal, construction, metals, motor vehicles, oil, power, rubber, steel, timber, priorities, transit, transport, aircraft, and ship repairs and salvage.

"More than a year and a half ago all controllers of the Wartime Industries





*"It Looks Like We'd  
Do It Better on a  
Hydratrol Lathe!"*



30" Heavy Duty  
Lathe with 13"  
Hole in Spindle

*Do It  
Better!...on a*

# HYDRATROL LATHE

*Large Hollow Spindle Type*

Look around your own shop—you may find a number of machining jobs which possibly could be done better on Large Hollow Spindle Type

of HYDRATROL LATHE. Send us prints of these difficult or too-costly jobs, for a specific, time-and-money-saving recommendation.

**FOR FASTER PRODUCTION • BETTER WORK • LOWER COSTS!**

**5 SIZES — 18" to 36"**

Small ..... 18" up to 7 1/4" Hole  
Medium ..... 24" up to 12" Hole  
Large ..... 27" up to 13" Hole  
Large ..... 30" up to 14" Hole  
Large ..... 36" up to 16 1/2" Hole

(Standard type lathes, 16" to 36")

**Lehmann**  
**MACHINE COMPANY**  
CHOUTEAU AT GRAND • ST. LOUIS 3, MO.

# IF YOU COMPARE THESE FEATURES WITH ANY OTHER HOIST IN THIS FIELD, YOU'LL BUY THIS FORD TRIBLOC

● Listed below are a few of the many features of the FORD TRIBLOC shown in this cut-away view. Many other hoists have some of these same features, but no other hoist in FORD's price class has all of them.

1. Precision-made ball bearings run in alloy steel races.
2. Ball-sealed oil ducts permit direct lubrication.
3. Drop-forged, heat-treated hooks of special steel slowly open before critical overloading of hoist.
4. Load-wheel pockets accurately pitched to chain.
5. Load-chain coupling drop-forged—easily detached.
6. Oil-less bronze bushings support driving pinion.
7. Load suspension members have safety factor of 5 to 1.
8. Automatic load-brake prevents slipping.
9. Fewer parts than any other hoist in its field.
10. Hook assemblies allow both rocking and swiveling.
11. Driving pinion is one-piece alloy-steel forging.
12. Pawl is drop-forged with file-hard tip.
13. Load-chain is high-carbon heat-treated steel.
14. Load-chain guard operates in any position.

*Order from Your Distributor*

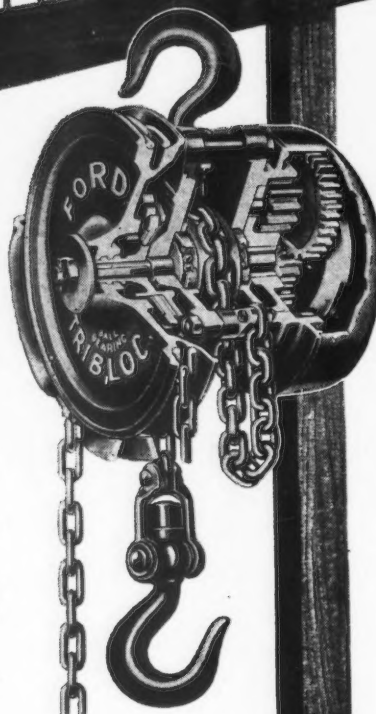
**ACCO**



Philadelphia, Chicago, Denver, Los Angeles,  
Portland, San Francisco, Bridgeport, Conn.

**FORD CHAIN BLOCK DIVISION  
AMERICAN CHAIN & CABLE**

*In Business for Your Safety*



tries Control Board were asked to prepare comprehensive plans for the ultimate unwinding of their controls. So steps have been ready for some time for any action required when the war in Europe is finally over and for later action with the end of the Pacific War.

"In addition, however, to this longer range planning, the supply situation of all materials under control has been kept under constant review. Following this, the relaxation and removal of restrictions and controls no longer found necessary has been quietly but steadily taking place. In line with the broad policy outlined, during the past year and a half, we have been able to effect some 125 relaxations of wartime control orders, without interference with the war effort.

"The list of some of the commodities where it has been found possible, because of an improved supply position, to effect relaxations, include such items of importance as aluminum, magnesium, zinc, copper, lead, steel products, machine tools, motor vehicle replacement parts, and others.

"In some cases, it has been possible to remove the control entirely while in others there has been merely such easing of the control as was warranted. In some cases, the relaxation or the removal of the control has been maintained, in others, with new changes in the supply picture, the pendulum has swung backwards again and some of the restrictions have had to be reimposed.

"Over a year ago, our steel picture improved to such an extent that we were able to remove restrictions on the purchase and use of various forms of steel. This was immediately reflected in a wider range of hardware and household items appearing on the market. The supply of steel has since deteriorated, and we have had to retrace our steps, but the relaxations did occur immediately when our supply position warranted it. Similarly all controls over the use of magnesium have been removed. Accordingly, this metal is now available to meet old needs and for use for all sorts of featherweight household aids that we may expect before many months go by after the end of the European War.

"Another most useful metal from the viewpoint of the general public is aluminum. We have been able to remove all restrictions on the use of aluminum and, while fabricating facilities today are quite tight, it is expected that within a short time the housewife will again be able to obtain the pot-



# So Now Brownie Is Happy With A.C.

I HEARD a stricken moan and looked over at Brownie, my boss. He's our Purchasing Agent and so has a right to look unhappy—decent supplies being as scarce nowadays as prospective husbands. But I never did see him look this sunk before.

"Miss Jones," he groaned, meaning me, "I got troubles. For years our Welding Department has done a swell job with D.C. equipment and Murex electrodes. You know: FHP for downhand work, Fillex for fast fillet welding, Genex for tacking and fitup, Type M or Type 90 for high tensile steels, and so on. Now the department's installing some A.C. units, and I have to try to locate and stock a whole new group of electrodes. I feel like sticking my head in an eight-ton drop hammer and Ending It All."

"You'll do better," I said, "to stick your head in the Welding Department and ask for Joe, the foreman. And I'm going

with you, to see you two don't come to blows about this."

But Joe, who's the excitable kind himself, just sort of tut-tutted poor Brownie's worries.

"Mr. Brown," Joe said, grinning, "every pound of Murex we have in stock works on both D.C. and A.C., including the Stainless. In fact, one of our A.C. units is already running, and going along swell on Murex."

Brownie practically collapsed on the nearest chair, he was that relieved. I felt the same way, knowing what troubles Joe's knowledge of Murex had saved me.

"And while you're here," Joe smiled, "you might take a request. Stock me some Murex Type A for vertical and overhead work on A.C., and some of their Alternex, which also does an extra-swell job on A.C. Meanwhile, forget your worries. Except for their type E6012 and E7012, practically all regular Murex

electrodes work as well on alternating current as on direct."

P.S. Miss Jones back again. I found out later how Joe happened to know things about Murex my own boss didn't know. He has one of those big Murex wall charts, dividing their thirty-odd electrodes by use on mild steels, low alloys, stainless, and hard-surfacing. It also shows at a glance the AWS-ASTM grade, polarity, current, etc., of each electrode. I wrote for one for Brownie, and I think no Purchasing Agent in a plant that does welding should be without one. You just drop a line to:

## METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK 5, N.Y.

ALBANY • CHICAGO • PITTSBURGH  
SO. SAN FRANCISCO • TORONTO



# MUREX Electrodes





## EUCLID *Cranes*

### WE CAN DELIVER

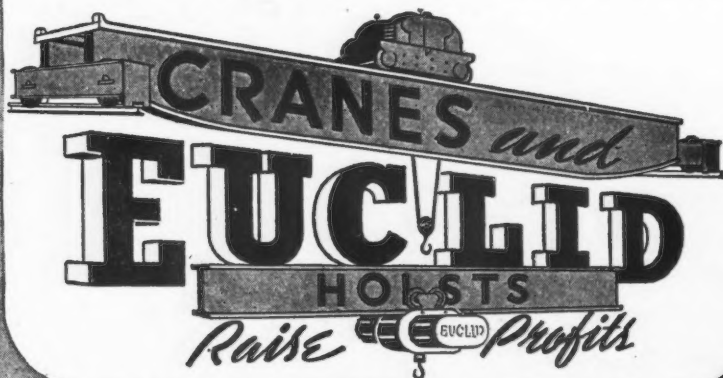
a limited number  
of 5 to 10 ton  
cranes in 60  
to 90 days

This type of Euclid Crane is ideal for many industries.

Convenient floor controls permit it to be operated skillfully by any of the several men working on the floor. They get the necessary "lift" instantly whether it be a speedy movement of material, or the precision of control required in modern foundry work, the placing of parts in machine tools, or the final assembly of finished parts. This saves valuable time and increases the output of each man-hour.

Euclid Cranes and Hoists don't have to be pampered. They embody safeguards against all contingencies and are as nearly "fool-proof" as it is possible to build. Above all they are products of quality that prove to be the cheapest to operate and maintain in the long run.

**THE EUCLID CRANE & HOIST CO.**  
1361 CHARDON RD., EUCLID, OHIO



and pans for which she has been yearning. Zinc is another metal of industrial and commercial importance in which we have been able to effect generous relaxations.

"So far as copper is concerned, while it has not been possible to make any general relaxation because of its widespread war use and because Canada is one of the larger sources of supply for the United Nations, yet even in this instance we have been able to make supplies available for certain civilian needs. For example, copper wire is more freely available today than formerly. It has also been one of the metals an increased quantity of which has been made available for the extension of public utility services in agricultural communities.

"A short time ago it was possible to wind up Machine Tools Control and this among other things involved in its wake the rescinding of an order preventing the making of new models. This now makes possible experimental work in the development of new post-war models of refrigerators, radios, washing machines and other fabricated articles.

"On the other hand, it is to be borne in mind that the adjustment of controls to meet changing supply situation must work both ways. Of late, with new war requirements, we are having some very good illustration of this. Materials that have been in free supply are again in such demand that it has become necessary to tighten the controls over their sale and use. Indeed, in some cases, it has been found necessary to impose new controls which thus far in the war it has been possible to avoid.

"Antimony which in civilian use is important among other reasons because it is an essential component in batteries, after being free of restrictions since last summer, a few days ago was placed back under control because of new and added war requirements.

"Aluminum foil is another example of a commodity concerning which we are finding it necessary to retrace our steps and to reimpose controls. Aluminum foil is used widely for anti-radar work and its use is now prohibited for all civilian purposes except the packaging of yeast and medicines. No longer can it be used for wrapping cigarettes and general foodstuffs.

"Steel provides perhaps the best example of changed war requirements making necessary a retightening of controls which previously had been relaxed. In many forms it is today in as short supply as at any time dur-

been  
l of  
ance  
fect

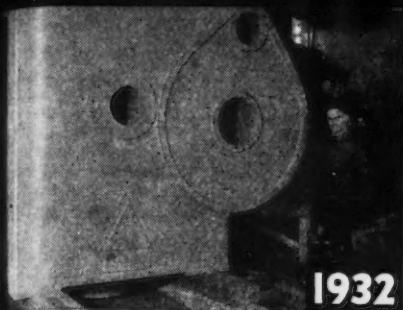
while  
any  
vide-  
nada  
pply  
n in  
e to  
rtain  
pper  
oday  
one  
ntity  
e for  
vices

ble to  
and  
ed in  
order  
odels.  
mental  
post-  
radios,  
fabri-

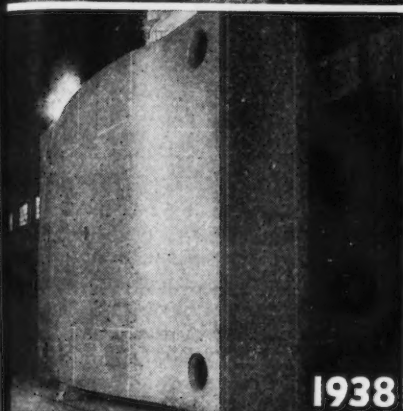
borne  
f con-  
situa-  
f late,  
ve are  
ion of  
in free  
d that  
en the  
e. In-  
found  
ontrols  
as been

use is  
ons be-  
ment in  
restric-  
w days  
trol be-  
require-

example  
which we  
race our  
s. Alu-  
or anti-  
ow pro-  
s except  
edicines.  
r wrap-  
oodstuffs.  
best ex-  
irements  
ening of  
ad been  
is today  
ime dur-



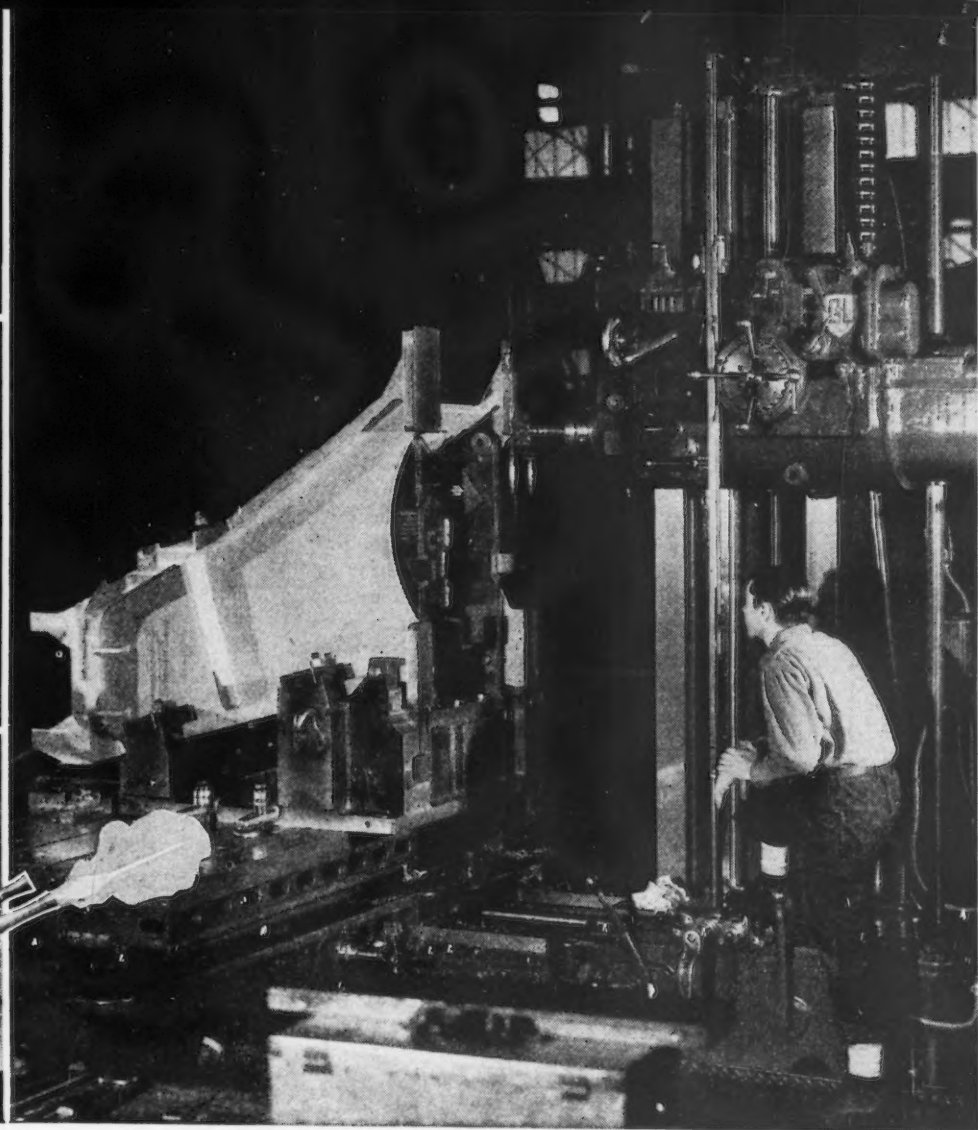
1932



1938



1944



## AN ADDED SERVICE TO THE RETOOLING OF AMERICA

When the day comes this company will have: Welding facilities for production of structures of any shape and any size within transportation limits. Machine tool facilities

to machine them. Engineering service skilled in machine design to assist you.

We will be glad to get in touch with you at any time.

**DANLY MACHINE SPECIALTIES, INC.**

2100 SO. 52nd AVE.



CHICAGO 50, ILLINOIS

# DANLYWELD

*Danly Die Sets • Die Makers' Supplies • Welded Steel Fabrication*



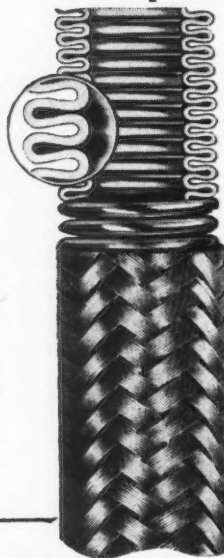
# REX-WELD



## ING OF FLEXIBLE METAL HOSE!

There are reasons for leadership in every line. Better performance, finer quality, greater versatility and dependability . . . these and many more have given REX-WELD Flexible Metal Hose the high reputation it has today. A reputation that has earned the confidence of industry everywhere. Industrial men know the advantages of REX-WELD. For this rugged, seep-proof, airtight product has been outperforming ordinary connections on a wide variety of applications throughout industry.

Let "Flexon," the C.M.H. trademark character, show you in the sketches below some of REX-WELD'S outstanding features. Then ask us to give you the full story about REX-WELD and the other flexible metal hose products in our complete line.



REX-WELD . . . stands up under terrific flexation, vibration and strain. Its heavier, more uniform wall structure gives it greater strength, longer life.

REX-WELD . . . handles steam with utmost safety. It is seep-proof to gas, oil, water and searching fluids. It is highly rust-resistant and non-deteriorating.



REX-WELD . . . operates efficiently under pressures up to 5,000 p.s.i., temperatures to 1000° F. Greater strength and durability are the result of its 50-50 principle of corrugation . . . of an autogenous welding process that makes the weld stronger than the tube itself.

REX-WELD . . . is available in bronze and steel in sizes from 3/16-in. to 4-in. I.D. (incl.), with annular or helical corrugations, braided or unbraided, depending on requirements. REX-TITE heatproof mechanical couplings are easy to install and are reusable.

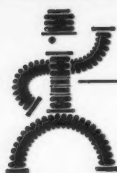


Flexible Metal Hose for Every Industrial Use



# CHICAGO METAL HOSE CORPORATION

MAYWOOD, ILLINOIS



Plants: Maywood and Elgin, Ill.

## NEWS OF INDUSTRY

ing the war. The shortage is particularly acute with respect to sheet steel, which is used largely in the manufacture of household articles. Accordingly, only a very limited quantity of sheet steel can be spared today for household use. This means a further setback in supplying washing machines and other household appliances which the public had hoped to receive before too long.

"In the work of relaxing and removing controls no longer found necessary, we have at times found men in business less anxious than our wartime controllers to see these controls removed. These men discovering, as they perhaps have, that some control measures have served to eliminate certain of their problems, have overlooked the fact that our materials controls are temporary and have no place in a period when supplies are adequate. Once the control is removed, it becomes the privilege and the responsibility of the individual once more to seek his own supplies, his own markets, and to plan his own production—in short, to fend for himself, just as he was accustomed to do in days of peace.

"These, then, are the broad principles under which the controls operate. But what of the future? What changes are likely to occur in the wake of the collapse of Germany?

"First of all, speaking generally, the close of the European War will not immediately of itself bring any widespread relaxation or removal of raw material control in Canada. While our controls should not and will not be maintained longer than is necessary, neither must they be removed in a wholesale and indiscriminate manner. There will be continued shortages which will not permit this. The Pacific War, the relief and rehabilitation of devastated countries, new and historical export markets, and domestic needs, will all be claimant agencies for various supplies that will still be short. The procurement and equitable distribution of these supplies will require a continuing need of certain of our controls.

"Secondly, there should, however, be a relaxation and removal of other controls equally important. Some of these would take effect shortly after the end of hostilities, while others would not become apparent before a number of months. Any program followed, because of continuing military and essential civilian needs, must be flexible and the relaxations gradual.

"STEEL: The supply should become adequate within a few months after



**J&L  
STEEL**

**J&L CONTROLLED QUALITY  
SHEETS**

*of J&L Controlled Quality Steel — insure  
consistent economy and satisfaction through-  
out all your fabrication.*

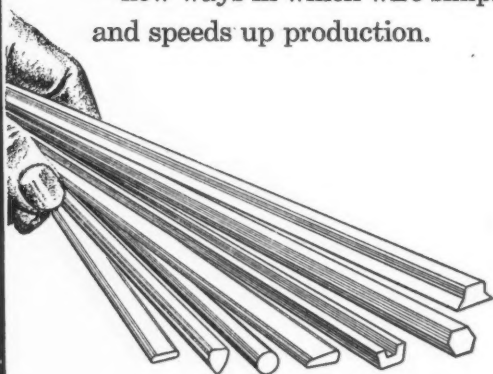
**JONES & LAUGHLIN STEEL CORPORATION • PITTSBURGH 30, PENNSYLVANIA**

THE IRON AGE, May 10, 1945—139

# PAGE Shaped WIRE

THE THINGS  
YOU CAN DO!  
WITH WIRE!

● Even **PAGE** engineers don't know all the ways wire is used in the manufacture of other products. They are constantly uncovering new uses—new ways in which wire simplifies, economizes and speeds up production.



You draw the shape—**PAGE** can draw the wire. End-section areas up to .250" square, widths to  $\frac{3}{8}$ "—of high or low carbon steel, Armco ingot iron, various analyses of stainless steel—finishes, lengths, packaging to your specifications.

If you can use wire to save one or more operations in the making of your product, that's a step toward more efficient production. If there is any possibility, it will pay you to

*Get in touch with Page!*

**ACCO**



Monessen, Pa., Atlanta, Chicago, Denver, Los Angeles,  
New York, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

PAGE STEEL AND WIRE DIVISION  
AMERICAN CHAIN & CABLE

## NEWS OF INDUSTRY

the collapse of Germany. With adjustments in our war programs we should be able to remove the control on the supply and use of steel entirely. Subject to labor being available, many of the plants now in full war production will be able to switch at least part of their capacity to making those articles in which steel is essential. Gradually, the washing machines, electric stoves and other consumer goods scarce today will become available.

**"OTHER METALS:** It should be possible to remove the restrictions on the use of most of the nonferrous metals, except tin and a few not widely used metals. The more widely used metals, such as aluminum, zinc, copper, brass, and nickel should become quite freely available. Adequate supplies of tin cannot be expected until the mines in the Far East are liberated and again producing for us and not for the Japanese.

**"AIRCRAFT CONTROLS:** It would be expected shortly after victory in Europe that aircraft control could be dissolved. This would mean the end of restrictions on the production of aircraft for civilian use and, subject to fabricating facilities, labor, and components being available, production of such types of aircraft could commence.

**"MOTOR VEHICLES:** Once labor and fabricating facilities are available it will take civilian production some months to get underway and following that until volume production has been achieved, it will be necessary to control distribution so that essential requirements may be met. Once these have been provided for, the control can be abolished.

"So far as light trucks are concerned, they have been coming off the assembly line for some time now for essential civilian use. Arrangements have been completed within the last few days to step up production for this purpose.

**"CONSTRUCTION:** Construction controls, in general, will have to be retained after the European War so long as there is a shortage of critical materials. There is a continuing severe shortage of basic materials entering into construction, such as lumber, and of building products, such as bricks, concrete blocks, and soil pipe.

"For the first full year after the end of the European War, materials for not less than 50,000 houses will be required. This, together with war needs and other essential civilian requirements, as for example, hospitals, will mean continuing controls so long as shortages exist.

## Leon Henderson Back From Chinese Mission

New York

• • • Leon Henderson, who since resigning as OPA administrator has served as chief economist for the Research Institute of America, has returned to the latter post after having completed two foreign assignments for the U. S. and Chinese Governments during the past several months.

Mr. Henderson's most recent assignment, just completed, was to make a study and recommendations on the Chinese inflationary problem for Chiang Kai-shek and the Chinese Government, whence he has just returned with T. V. Soong, who is attending the International Conference in San Francisco. Prior to his Chinese mission, Mr. Henderson spent several months in Europe on an official assignment by the Foreign Economic Administration to study the problem of the economic control of Germany after the war.

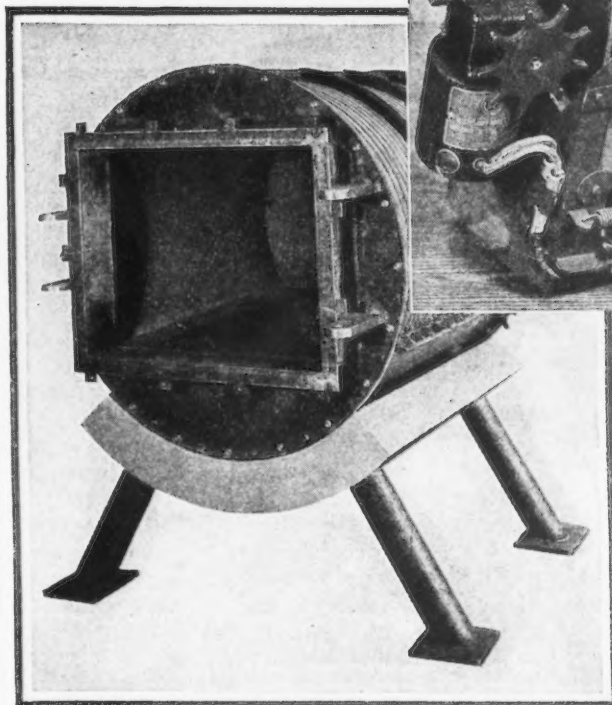
As chief economist for the Research Institute, Mr. Henderson will contribute to the advice and counsel on government regulations and economic trends the institute provides for its more than 30,000 members.

## Monarch Machine Tool Shows Decrease After Taxes

Sidney, Ohio

• • • Estimated earnings of the Monarch Machine Tool Co. for the first quarter of 1945 amounted to \$238,632, or \$1.13 a share on the 210,000 shares outstanding. This amount, according to the quarterly report, was after adjustment of sales and profits, based on anticipated repricing of aircraft products, and after provision for federal, normal and excess profits taxes (less postwar credit) and before renegotiation.

This compares with average 1944 quarterly earnings, on a comparable basis, of \$303,304, or \$1.44 per share. Due to the uncertainty of renegotiation, no provision has been made for it in the earnings estimate. Shipments in the first quarter of 1945, after estimated re-pricing adjustments on aircraft products, amounted to \$4,209,407, compared with average 1944 quarterly shipments of \$3,821,715. During 1944 no aircraft products were shipped.



**Ammunition Booster** to feed belted ammunition to machine guns on Martin airplanes. Built of stainless steel by Brandt of Baltimore.

**3,800 lb. Electro-Processing Oven**, fabricated by Brandt for a cork board plant.

## These Fabrication Facilities May Fit Your Postwar Plans

If your postwar production will include some fabrication to be done by a reliable, experienced, metal-working organization . . . Brandt of Baltimore can fill a definite need for you.

For over 50 years Brandt has fabricated metal for scores of industrial uses. Present products range from small, formed units of a few ounces to huge fabricated assemblies weighing 30 tons. The Brandt 8½ acre plant has complete, modern equipment for shearing, rolling, forming, welding. Machine capacities range from the lightest gauge up to and including 1¼" mild steel or ¾" armor plate. All metals, ferrous, non-ferrous and alloy, can be completely fabricated to your specifications.

And if you've hit a snag on your postwar product, our designers and engineers will welcome the opportunity to assist in planning the details and specifications. Naturally, all plans will be held in strict confidence. So if there are fabrication or design problems in your postwar plans, we invite you to discuss them with—

# BRANDT of Baltimore

Charles T. Brandt, Inc., 1716 Ridgely Street  
Baltimore 30, Maryland



**BRANDT of Baltimore • Craftsmen in Metal Since 1890**





"Let us have faith that right makes might,  
and in that faith let us to the end dare to  
do our duty as we understand it."

LINCOLN

## *The Wish is Parent to the Thought*

Without exception, it is the wish of every American that this country, after Victory, embark on a long period of sound prosperity. With that thought uppermost in all minds, let us, individually, dare to do that which is set before us with such zeal and understanding that the world will be as astounded as the enemy was, with our ability to work successfully together.

As the Great Emancipator says: "Let us to the end dare to do our duty as we understand it." Or as another great ambassador put it: "Let us run with patience the race set before us." That means from cradle to grave you should do your best work, all ways.

That every American buy Bonds again and again . . . and hold them, may seem like a large order. That is the thought, however, parented, we hope, by you.

## UNIVERSAL PRECISION BALLS

OF STEEL, BRONZE AND SPECIAL MATERIALS

PRODUCTS OF  
VULCANITE PORTLAND CEMENT CO.  
WILLOW GROVE, Montgomery County, Pa.

Established 1894

Telephone: Willow Grove 1200

### FEATURE CONTINUATION

## Super High Speed Cutting of Metals

(CONTINUED FROM PAGE 69)

reached 10,000 r.p.m. and a speed of 10,000 ft. per min.

This mill quickly and efficiently cut marble. After cutting a slab of marble measuring 3¼ ft., the teeth of the cutter showed no signs of wear when examined under a microscope. This discovery permits the use of a miller in the machining of building materials.

Powerful lathes are needed in the high speed machining of metals. If the energy used in high speed cutting of 1 lb. of shavings is the same as in low speed cutting, then with an increase of the speed both the energy and power should increase proportionately. Judging by the conclusions reached in these experiments, however, it should follow that the energy expenditure on 1 lb. of shavings at high surface cutting speeds should be less than at low speeds.

The type of the future high speed lathe can be imagined as follows: the headstock will be lighter in construction, transmission gears will be absent, and on the carriage there will be mounted a powerful high speed electric motor on the shaft of which will be attached a milling cutter. In such a lathe the work would be turned at a constant, comparatively high speed and the motor with the miller would perform the same functions as a cutting tool in an ordinary lathe.

### References

<sup>1</sup>Summary of a report made by V. D. Kuznetsov in 1937 at the Commission on Cutting Metals, is given in an article by engineer E. P. Nadeinsky in *Vestnik Metallopromyshlennosti*, No. 3, 1940.

<sup>2</sup>V. D. Kuznetsov, "Physics of Hard Bodies," *Tomsk*, 1932.

<sup>3</sup>Journal of Applied Physics, No. 6, 1929. (Russian.)

<sup>4</sup>M. O. Kornfeld and M. M. Riukin, *JETP*, No. 9, 1939, p. 595.

<sup>5</sup>Engineer V. N. Shvetsov conducted all the experiments and constructions for the research project.

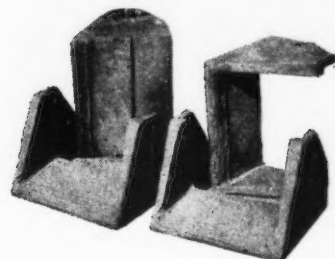
<sup>6</sup>Journal of Technical Physics, No. 9, 1939, p. 1063 (Russian). Practically the entire issue No. 9 is devoted to the problem of low temperature embrittlement. All the work was done in the laboratories of N. N. Davidenko.

## Deep Drawing Magnesium Alloy Sheets

(CONTINUED FROM PAGE 74)

tions stated in these tests are those obtained when working under carefully controlled conditions and therefore, they may not be applicable to a production setup. The reductions for a production setup would probably have to be lower than those in-

## Hard-Facing gives Ball Mill Scoop Lips More "ON THE BALL"



You naturally expect these hard-faced scoop lips to successfully withstand hard use and abuse and to last longer. Because of their Coast Metals protective overlay, welded over surfaces exposed to severest wear, they are giving more and better service than ever before.

When they become worn, another Coast Metals Hard-Facing makes them as wear-resistant as when new. Successful applications such as this indicate the possibilities for making your own equipment last longer at surprisingly low cost.

Write for our new pamphlet today.

COAST METALS, INC.

Plant and General Offices: Canton 6, Ohio

Executive Offices: New York, N.Y.

**COAST  
METALS**  
*hard-facing  
weld rods*

MAKE YOUR  
EQUIPMENT LAST LONGER

## FEATURE CONTINUATION

icated in Fig. 3 in order to keep the draw scrap at a minimum. The curve of Fig. 6 shows the reductions for single draws which are considered feasible for production conditions when using mechanical presses for drawing magnesium alloy sheet.

A small scale production run has been made since the completion of these drawing tests and the results were quite favorable. The curve of Fig. 6 was used to determine reductions and tool temperatures and was found to be satisfactory. Tool temperatures of 550 to 600 deg. F. were maintained on the first and second draw tools. The first draw reduced a 0.040x15% in. diameter, AM-C52S-0 blank to a 8% in. diameter shell. This shell was then redrawn to a finished shell 5 in. in diameter and 9% in. deep. This first draw represents an approximate 47 per cent reduction in blank diameter and the second draw is approximately a 40 per cent reduction in shell diameter with an overall reduction from the original blank diameter to finished shell diameter of approximately 68 per cent. Sidewalls measurements taken at the top of the shell reveal an average wall thickness of 0.045 in. This uniformity can be attributed to the use of a 90 deg. blankholder, the same as for the first draw in the drawing tests, Fig. 1. However, this change increases the possibility of breakage, because of the more severe stretching of the sidewall during the second draw.

Difficulty was encountered in using gas burners to heat the tool, because of the fluctuation in tool temperature. This was eliminated by using electric resistance heaters in the second draw die and blankholder which kept the tool temperatures constant. Constant tool temperatures are important, since conditions such as blankholder pressure and punch clearance should be varied with temperature. Once proper drawing conditions are established, it is essential that they remain constant.

Additional production runs will no doubt result in various tool refinements for controlled heating of the dies and blankholders. Water cooled punches should be an advantage in keeping the metal in contact with the punch cool during the drawing operation. All of these various improvements will give control of temperature during drawing which should result in better shells. Tool designs, such as clearances and die and punch radii, will also be further investigated to determine their effect when hot drawing magnesium alloy sheet.

Press lever shoes on the Rehnberg-Jacobson Automatic Shell Banding Machine are made of Ampco Metal. Each shoe is subjected to a crushing force of approximately 75,000 lbs. during each stroke of the machine. There has been no occasion to replace the Ampco Metal shoes.

**No Costly Shut-downs**  
due to metal failures

... where machine tool parts  
are made of wear-resisting  
**AMPCO METAL**

Five grades and a  
number of modifications available  
— in a form to fit specific needs...

To protect you against costly "down time" for repairs due to metal failures, leading machine tool builders (over 90 of them) standardize on parts of Ampco Metal—a series of aluminum bronze alloys tailor-made to meet severe operating requirements.

With physical properties that can be regulated to suit the application, versatile Ampco Metal lasts several times as

long as ordinary bronzes. The variations retain Ampco's distinctive characteristics: Controlled hardness. High tensile and compressive strength. Stubborn resistance to wear, shock, impact, fatigue, "squashing out." Good bearing characteristics.

Check for this protection against breakdowns in the specifications of machines you buy. Replace worn parts of your older machines with durable Ampco.



The Metal without an Equal

IA-5

**FREE** "File 41—Engineering Data Sheets" illustrates and describes many applications using Ampco Metal successfully. Shows why it's good business to check for Ampco Metal as a mark of quality in the machine tools you buy. Use the coupon at right to request your copy.

**Tear out  
coupon  
and  
mail  
today!**

AMPCO METAL, INC., Dept. IA-5, Milwaukee 4, Wisconsin

Send me, without obligation,  
"File 41—Engineering Data Sheets."

Name.....Position.....

Company.....

Address.....☐ Home ☐ Business

City.....(.....) State.....

# MACHINE TOOLS

... News and Market Activities

## Essential Civilian Business Continues to Support Sales Volume

### Chicago

... Machine tool sales agencies in this territory continue to pile up a substantial sales volume built principally on orders from so-called essential civilian industry.

Orders are rolling in from many sources, with the number of purchasers almost equaling the number of units sold. Indications that the trade here has little to fear from V-E Day in the matter of mass cancellations is shown in numerous orders received from farm equipment makers, railroads and railroad equipment industries. Orders from all of these sources give promise of continuing. Some of the farm equipment manufacturers have indicated that they are considering sizable tooling projects for new models. The railroads have embarked on long overdue rehabilitation of their shops taking advantage of their favorable financial condition to install modern maintenance equipment.

Cancellations have scarcely made a dent in net order volume. Factory deliveries have not been materially advanced as a result of war business being removed from the books. Space on machine tool builders books follow-

ing aircraft engine cutbacks apparently has been replaced to a large extent by speedup of orders for the jet propulsion program in heavy volume, local dealers believe. Deliveries quoted on standard tools average about six months. Unrated orders are not faring too well, and some orders placed last December still being scheduled for December, 1945, delivery. Lack of material available for production of this equipment constitutes the major barrier which must be surmounted before manufacture can get underway, aside from manpower considerations.

Sale of surplus government equip-

ment so far has created little hubbub in the trade. Equipment being offered for sale currently at Springfield, Ill., and Indianapolis, is not of a type to create interest among the larger industries in this district upon whom the hope of heavy future order volume rests, with exceptions, it is stated.

Manufacturers' delivery schedules this month are dominated by foreign orders, notably those for Russia. Deliveries under the current Russian Protocol, which was set up for completion by June 30, will not meet the deadline. These are expected to slop over into the second half of the year if adequate extension can be arranged. Recent new foreign orders include tools for rehabilitation of French railroads with more expected to follow.

o o o

## Industry Awaits Big Cutbacks

### Cleveland

... The revocation of Limitation Order L-108 which permits machine tool builders to go back to pre-war finishes, announced recently, also permits the use of fillers, prime coats, and machine tool gray.

A general feeling among tool builders of anticipation is awaiting clarification of the procedures for the dis-

posal of tool surpluses. Following the hearings in Washington held during the previous week, action is expected immediately on the creation of a central source of information on tool surpluses.

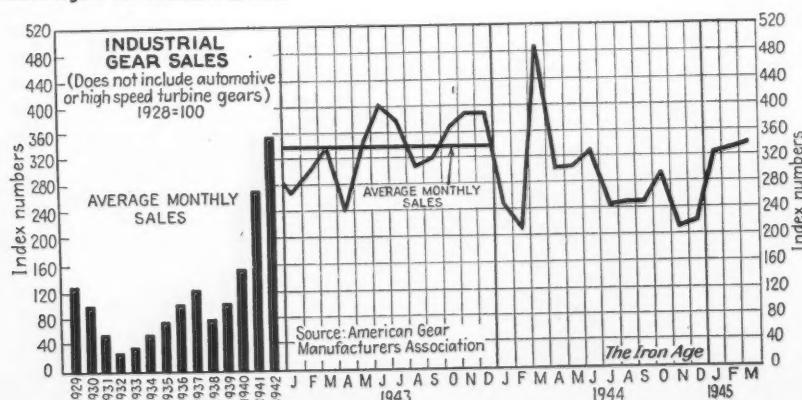
Most builders are busy planning for the production of automobile reconversion tools, and are said to be getting a maximum of help from Washington on this work. Promises from the nation's capitol include all the material that is required, priorities furnished where needed, and clear sailing is expected on all problems except that of manpower.

Tool cancellations are continuing to be small, according to the largest producers no larger than can be expected due to the normal shift of war emphasis. The impact of immediate VE-Day cutbacks is expectedly awaited, and more cancellations are looked for in the very near future.

A transition period is expected in the tool industry when everything will be very slow, but the demand for peacetime goods is already a very real thing, and when the shops get ready to answer that demand the whole machine tool industry will benefit. Some shops will, of course, profit more than others, according to whether they make light or heavy tools.

## March Gear Sales Increase

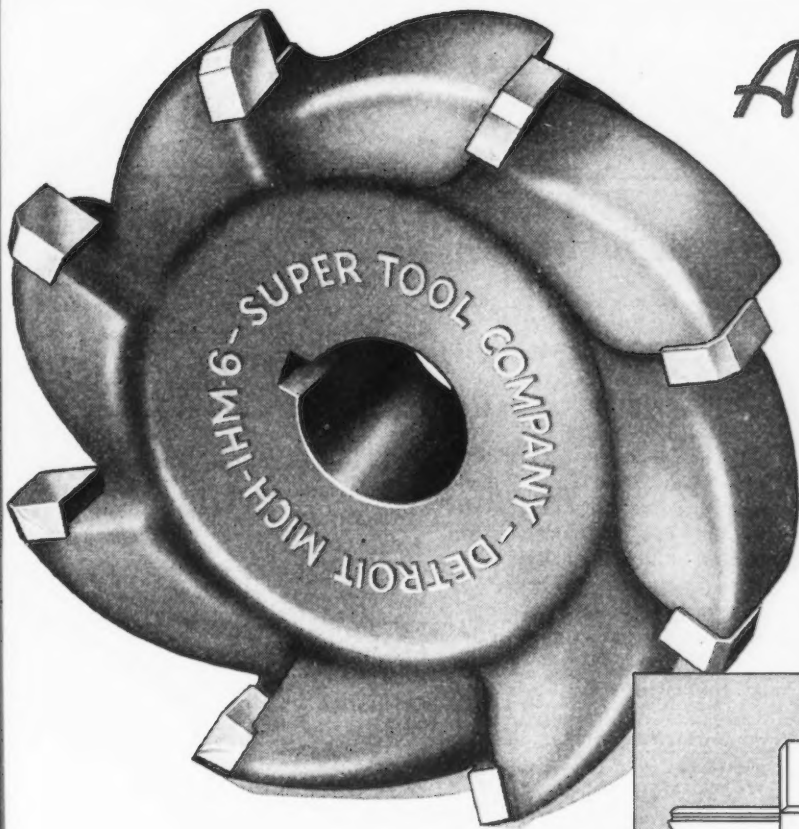
... The gearing industry, as represented by the members of the American Gear Manufacturers Association, shows an increase in volume of sales for March, as compared with February, of 2.4 per cent. This report does not include turbine or propulsion gearing. The index figure for March was 339.



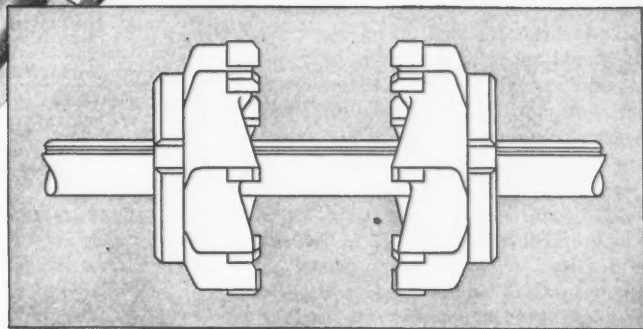


*Announcing-*

the New  
**SUPER  
HALF SIDE  
MILL!**



**Another Addition to  
the Most Complete  
Line of Carbide Tipped  
Cutters on the Market!**



*Designed to be used in pairs for straddle  
milling or singly to cut on one side only*

Here's another Super development—another addition to Super Tool's extensive line of Carbide Tipped Tools! The New Super Half Side Mill!

Here is a rugged, heavy duty tool designed for the tough jobs . . . those production jobs that are too heavy for regular half side mills.

Made in both right hand and left hand, these half side mills are available in a range of sizes from

4" to 12" in diameter. They are manufactured in three types for non-ferrous, cast iron and steel. Designed for straddle milling, they can be mounted individually on an arbor to cut on one side only.

Most sizes are now available for immediate delivery from stock. The complete range of sizes will be available from stock soon. Write, wire or phone for complete data and prices.

**Whatever  
YOUR CUTTING JOB  
LOOK FIRST TO  
SUPER**

★  
**CARBIDE TIPPED  
TOOLS FOR**  
Turning, Facing  
Reaming Forming  
Spot Facing  
Boring Grooving  
Grinder Rests  
Wear Parts  
Counterboring  
Shaving Centers and  
Special Purposes

**SUPER TOOL COMPANY**

*Carbide Tipped Tools*

21650 Hoover Road, Detroit 13, Michigan ★ 4105 San Fernando Road, Glendale 4, California

# NON-FERROUS METALS

... News and Market Activities

## Lead Industries Oppose Tariff Reduction

### Washington

• • • Appearing before the Ways and Means Committee of the House of Representatives, Felix E. Wormser, secretary, placed the Lead Industries Association in opposition to the bill authorizing a further cut of 50 per cent in rates of duty prevailing on Jan. 1, 1945, H.R. 2652. The association was said to represent practically all U. S. lead mining, manufacturers of metallic lead products, and lead chemicals and pigments.

The opposition to the bill was based on the fact that the duty on lead has already been reduced 50 per cent for the duration of the war in the trade agreement with Mexico, extended to all countries, notably Canada, Peru, Australia and the Argentine, under the "most favored nation" policy. Current duties on lead products are 3/4c. per lb. for lead content of ores, matte and flue dust; and 1 1/16c. per lb. for lead in bullion, pigs, dross and other forms. Under present legislation, the industry anticipates an increase of duties 30 days after the termination of hostilities to 1 1/5c. per lb. on lead in ores, matte and flue dust, and 1 7/10c. per lb. on lead in other forms.

Mr. Wormser said that it had required an approximate average price of 8 1/4c. per lb. to bring out a production of 400,000 tons of lead in the United States in 1944. He estimated that less than 200,000 tons could have been produced at the ceiling price of 6 1/2c. per lb. At the same time, foreign

producers were supplying large tonnages of lead to the United States or Great Britain at approximately the following prices: Mexico, 6 to 6 1/2c.; Canada and Australia, 5c. or less per lb.

Mr. Wormser said that there are undoubtedly large reserves of lead which await discovery in the United States, but they can be found only if a healthy lead mining industry continues to exist under the protection of an adequate tariff. He said the tariff issue is concerned principally with an equalization of competitive wage rates, and that south of our border wages are only 1/5 of U. S. rates. Canada, moreover, has richer ore deposits than ours.

## Relaxations Expected By Copper Producers

### New York

• • • Order books for May delivery of copper closed with requirements well below recent activity levels according to producers here who attribute this development to the trend of the war.

WPB's Copper Division has announced a reduction of copper consumption by 15 per cent. The total cutback in copper and copper alloy consumption by the military services after VE-Day is to be about 1/4 million tons quarterly below that scheduled for the second quarter, according to Hiland G. Batcheller, WPB's

chief of operations. However, since the scheduled level is in excess of current use, the estimated cutback should be only about 172,000 tons. In refined copper content, this would represent 74,000 tons quarterly.

Members of the industry, considering relatively low May business together with cutback estimates of WPB, are wondering whether action on the relaxation of restrictions is not overdue.

The sentiment of copper producers is divided on the question of reduction of import duties which would be permitted under the extension of the Reciprocal Trade Act now under consideration by the Way and Means Committee. Therefore there is to be no representation before the Committee by the Copper Institute, producers trade association. Copper is considered to be in a better position with respect to tariff than either zinc or lead since there has been no reciprocal reduction of 4c. per lb. duty in the case of copper.

## Incentive and Piecework Rates Still Need Approval

### Chicago

• • • Installation of new incentive wage or piece rates still require War Labor Board approval and, in cases where employees represented by a union are affected, a union signature is required, the WLB points out.

Changes in existing incentive rates may be made without approval of the board, however, where the rate is changed to reflect a change in method, product, tools, material design or production conditions; or when a new production item is placed on an incentive basis in a department of a plant where an established incentive rate plan is in operation, provided that the established rate setting principles and standards of the plant which is in operation are applied to the new items. These instances are further defined in WLB general order No. 38, as amended March 24, 1945.

A recent dispute at the Gary sheet and tin mill of Carnegie-Illinois Steel Corp. (see THE IRON AGE, April 12, 1945, page 102) hinged on a board ruling that an incentive plan change did not require approval.

Mine Production and Imports of Lead  
In Short Tons

Source: Dept. of Commerce and WPB.

	Imports				Production
	Lead in ore and matte	Lead in base bullion	Pigs, bars, sheets, and scrap	Total lead content	Domestic mines
1935.....	20,000	2,700	1,300	24,000	331,000
1936.....	20,700	300	2,600	23,600	373,000
1937.....	34,100	1,800	4,900	40,800	465,000
1938.....	45,400	15,300	3,200	63,900	370,000
1939.....	30,800	48,900	7,100	86,800	410,000
1940.....	111,300	19,600	151,600	282,500	457,000
1941.....	107,000	.....	274,000	381,000	461,000
1942.....	123,000	.....	369,000	492,000	496,000
1943.....	70,000	.....	243,000	313,000	446,000
1944.....	90,000	.....	220,000	310,000	417,000

# NONFERROUS METALS PRICES

## Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	\$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb.)	\$1.50 to \$1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.9%, dollars per troy oz.	\$4.00
Iridium, dollars per troy oz.	\$120.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	\$157.00 to \$160.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

## Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2) 9.00 to 10.00	
Aluminum, deoxidizing No. 2, 3, 4	\$6.00 to 9.50
Brass ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
90-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

## Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.37	20.37	
Copper, H.R.		17.37	
Copper drawn		18.37	
Low brass, 80%		20.40	20.15
High brass			19.48
Red brass, 85%		20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut		15.01	
Commercial bronze, 90%		21.32	21.07
Commercial bronze, 95%		21.53	21.28
Manganese bronze	24.00		28.00
Phos. bronze, A, B, 5%		36.50	36.25
Muntz metal	20.12	18.37	22.75
Everdur, Herculey, Olympic or equal		25.50	26.00
Nickel silver, 5%		28.75	26.50
Architect bronze	19.12		

## Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (1/2 H); 52S, 61c. (O); 24S, 67 1/2 c. (T).	
Plate: 0.250 in. and heavier: 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.3c.; 24S, 24.2c.	
Flat Sheet: 0.188 in. thickness: 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.	

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.  
Extruded Shapes: "As extruded" temper: 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2 c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2 c. per lb.; 1/2 in., 26c.; 1 in., 24 1/2 c.; 2 in., 23c. Hexagonals: 1/4 in., 34 1/2 c. per lb.; 1/2 in., 28 1/2 c.; 1 in., 25 1/2 c.; 2 in., 25 1/2 c. 2S, as fabricated, random or standard lengths, 1/4 in., 24c. per lb.; 1/2 in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2 c.

## NONFERROUS SCRAP METAL QUOTATIONS

(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

### Copper, Copper Base Alloys

#### OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

#### OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zincy bronze borings	8.00
Zincy bronze solids	8.00

#### OPA Group 3†

Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.35 <sup>1</sup>
Manganese bronze solids	6.25 <sup>1</sup>
Manganese bronze borings	6.50 <sup>1</sup>
Manganese bronze borings	5.50 <sup>1</sup>

#### OPA Group 4†

Refinery brass	4.75*
----------------	-------

\*Price varies with analysis. <sup>1</sup>Lead content 0.00 to 0.40 per cent. <sup>2</sup>Lead content 0.41 to 1.00 per cent.

## Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

### Other Copper Alloys

Briquetted Cartridge Brass Turnings	5.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

## Aluminum

### Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S	
25S turnings, dry basis	5.00
Low copper alloys 51, 52, 61, 63S solids, dry basis	3.00
turnings, dry basis	7.50
	5.75

### Plant scrap, mixed

Solids	4.00
Turnings, dry basis	2.50

### Obsolete scrap

Pure cable	8.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

## Magnesium\*

### Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	1.50
---	------

### Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

\*Nominal.

## Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unswaged zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

## Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

## Nickel

Ni content 98+%, Cu under 1/2%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

## ELECTROPLATING ANODES AND CHEMICALS

### Anodes

(Cents per lb., f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25%
Electrodeposited	18%
Rolled, oval, straight	19%
Curved	20%
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23%
Zinc, cast, 99.99, 15 in. or longer	16%
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 1-9 troy oz., per oz.	53*

### Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver cyanide, 100 oz. lots	-41.79
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 89 per cent, crystals, bbls., frt. allowed	6.35

\*Price based on use of foreign silver.



## Market Continues to Wait Developments

### New York

• • • A note of caution underlies the market this week. Despite anticipated setbacks to open hearth grades based on the action of a large consumer in the eastern district, declines in heavy melting scrap grades failed to materialize this week. However, turnings prices in a number of markets continued to drop.

It is apparent that the market is being sustained by a tight scrap supply relatively low mill inventories and adherence of buyers to the recommendation of the government in maintaining adequate inventories. The fact that contract cutbacks of an appreciable nature have not yet been ordered is undoubtedly a factor in the picture. There is evidence that all scrap interests are moving cautiously in order to protect their market position.

The scrap situation in Pittsburgh is so tight as to require purchases in eastern districts. In fact the position in this district is such as to establish price increases in certain turnings grades. This is also true of Chicago. Turnings grades dropped in Detroit, Cincinnati, Philadelphia and New York. Allocations are reported in Buffalo and in St. Louis and this is a further indication of the tight market condition.

**PITTSBURGH** — The scrap market here continues tight except for mixed and machine shop turnings, where a 50c. a ton drop in price has resulted. Short shoveling turnings contracts for May were made mainly on the \$16 to \$16.50 spread, strengthening the market a bit. The action of Bethlehem Steel in the East in reducing the prices on No. 1 busheling, No. 2 and No. 3 bundles and eliminating the 50c. brokerage commission will have no great effect here on the market. In fact, one local consumer indicated that it would be willing to buy at ceiling in the East, with up to \$1.50 a ton springboard on bushelings and No. 2 bundles. This would net the eastern seller more than Bethlehem will pay on these grades.

**CHICAGO**—No immediate price reaction is noted in the market as a result of war news. Mill purchasers who placed orders last week on the basis of current production levels state that no cancellations will be made unless orders for finished steel are seriously cut. Last week's tone was one of strength with machine shop turnings being purchased

at \$11.00. No. 2 bundles and other open hearth grades at ceilings. Heavy artillery shell cancellations are expected to result in reduced turnings production in the future, with possible price rises if current demand continues.

**DETROIT**—With users of baled turnings leaving the market, prices on machine shop turnings broke down notably here this week and there was weakening in the other related portions of the list. Steel scrap continued to hold at ceiling prices, but brokers were exercising caution until attitudes of mills clarified in the week of VE-Day.

**BUFFALO** — Unsettlement of East Coast markets has had no effect on prices locally, although lighter grades are reported slightly easier. Dealers assert the disposition of two rail lists last week, with all items except turnings and sheet steel being allocated, provides a good overall picture of this market. The relative strength is ascribed to the combination of comparatively low consumer stocks, The high operating rate, and the lowered efficiency of yards because of the manpower shortage. Some melters currently report they are breaking even in the matter of inventories, while others are building up stocks moderately. Last week marked the end of the initial rush of scrap down the lakes.

**BOSTON**—Price structure of borings and turnings is again beclouded although not actually lower. Big buyers have withdrawn from the market and trade supposition is that they are jockeying for lower prices. Offers on bundled material in some instances are \$1 a ton lower with no sales reported. In contrast, allocated tonnages of No. 1 steel are moving from the Bethlehem-Hingham shipyard, contract chemical borings move steadily to gas purifiers, and foundries take all available cast, these three at ceiling prices. Cold rain has slowed up yard operations.

**NEW YORK**—The leading consumer and another mill in this district are refusing to pay a brokerage commission on new contracts for No. 1 and 2 melting steel. Their buying prices for No. 1 and 3 bundles have been reduced \$3 below ceilings by one and \$2 by the other. The leading consumer has reduced his buying price for turnings to \$7.50 without commission. On the other hand, a Pittsburgh mill has placed an order for open hearth grades at ceilings, filled out of the Metropolitan area and Connecticut.

**PHILADELPHIA** — Two mills here have placed orders for No. 1 and No. 2 heavy melting steel scrap grades that exclude the 50c. broker's commission. Sales of No. 2 bundles have been made at \$2.50 and \$3.50 below ceiling. The little buying that took place last week dwindle

dled to a virtual standstill at the beginning of the week as mills embarked on a policy of watchful waiting to see the extent of VE-Day cutbacks. Cast scrap, however, continues to be strong and while there has been no break in the price of low phos, very few commitments have been made for this grade. Turnings prices remain nominal.

**ST. LOUIS**—Allocations to steel mills in the Chicago district of heavy tonnages of scrap iron for May and June delivery have taken care of all available material in this market, and will eliminate the possibilities of any distressed scrap after VE-Day. Mills in the St. Louis industrial district have comfortable inventories. Prices are unchanged.

**BIRMINGHAM**—As a result of the situation in Europe, mills are very cautious in making purchases and there's a possibility that contracts not delivered in dates specified will be canceled. Despite a buying lull, there has not been a drop in prices.

## Open Hearth Break Foreseen by Some New York

• • • Many scrap observers were wondering this week if in addition to recent slight weaknesses in some scrap prices there would soon be a major break on open hearth grades. It is recalled that prices dropped substantially last fall when rumors appeared that the end of the war was due.

After remaining below ceiling levels for many weeks, prices started slowly upward and by the end of the year had approached or were at ceiling levels. There are some in the trade who look for no sharp decline in the price level of scrap. Their argument is that as soon as cutbacks have been implemented and reconversion well on its way, holes in steel mill schedules will have been plugged up and steel operations restored to almost capacity rates.

Other sources, however, while acknowledging that steel output after a temporary lull engendered by cutback confusion will again rebound, hold that a temporary decline in scrap prices will soon come. Such a decline they believe will discount any excess of scrap which might appear temporarily when related to any decline in steel output which may materialize within the next few months.

# IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted transportation charges. Asterisks indicate grades selling at ceilings.

## PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bldd. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	\$13.00 to 13.50
Short shov. turn.	16.00 to 16.50
Mixed bor. and turn.	13.00 to 13.50
Cast iron borings	15.00 to 15.50
Hvy. break. cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Roller steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

## CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	\$16.25 to 16.75
Galv. bundles	14.25 to 14.75
Mach. shop turn.	10.50 to 11.00
Short shovel. turn.	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Mix. borings & turn.	12.00 to 12.50
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Rails 3 ft. and under	22.25*
Locomotive tires, cut	22.50 to 23.00
Cut bolsters & side frames	19.75 to 20.25
Angles & splice bars	22.25*
Standard stl. car axles	23.50 to 24.00
No. 3 steel wheels	22.00 to 22.50
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

## CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	\$7.50 to 8.00
Shoveling turn.	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Mixed bor. & turn.	7.50 to 8.00
Low phos. plate	22.00*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Stove plate	19.00*
Scrap rails	21.00

## BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	\$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovellings	\$10.00 to 10.06
Machine shop turn.	8.00 to 8.50
Mixed bor. & turn.	8.00 to 8.50
C'n cast, chem. bor.	13.06 to 14.10*
Truck delivery to foundry	
Machinery cast	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

## DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	\$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	\$7.50 to 8.00
Short shov. turn.	10.25 to 10.75
Cast iron borings	9.50 to 10.00
Mixed bor. & turn.	7.50 to 8.00
Low phos. plate	19.32 to 19.82
No. 1 cupola cast.	20.00*
Charging box cast.	18.00 to 19.00
Hvy. breakable cast	16.50*
Stove plate	18.50 to 19.00
Automotive cast	20.00*

## PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$18.75
No. 2 hvy. melting	18.75
No. 2 bundles	\$16.25 to 16.75
Mach. shop turn.	10.00 to 10.50
Shoveling turn.	11.50 to 12.00
Cast iron borings	14.75*
Mixed bor. & turn.	10.00 to 10.50
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle, forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

## ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	\$17.50*
Bundled sheets	17.50*
Mach. shop turn.	\$7.00 to 7.50
Hvy. axle turn.	12.00 to 12.50
Locomotive tires, uncut.	20.00*
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	23.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 machinery cast	20.00*
Breakable cast	16.50*

## BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	\$9.50 to 10.00
Cast iron borings	9.50 to 10.00
Bar crops and plate	19.50*
Structural and plate	19.50*
No. 1 cast	20.00*
Stove plate	17.00
Steel axles	18.00*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50*
Rails 3 ft. & under	21.00*
Cast iron carwheels	16.50 to 17.00

## YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	\$13.00 to 13.50
Short shovel. turn.	15.00 to 15.50
Cast iron borings	14.00 to 14.50

## NEW YORK

Dealers' buying prices per gross ton, on cars

No. 1 hvy. melting	\$15.33
No. 2 hvy. melting	15.33
Comp. black bundles	\$12.83 to 13.33
Comp. galv. bundles	10.83 to 11.33
Mach. shop turn.	7.00 to 7.50
Mixed bor. & turn.	7.00 to 7.50
Shoveling turn.	10.25 to 10.75
No. 1 cupola cast.	20.00*
Hvy. breakable cast	16.50*
Charging box cast.	19.00*
Stove plate	19.00*
Clean auto cast.	20.00*
Unstrip. motor blks.	17.50*
C'n chem. cast bor.	14.33*

## BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	13.00
Shoveling turn.	15.00
Cast iron borings	14.00
Mixed bor. & turn.	13.00
No. 1 cupola cast.	20.00*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

## CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn.	\$11.50 to 12.00
Short shovel.	14.00 to 14.50
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	13.00 to 13.50
Mixed bor. & turn.	12.00 to 12.50
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

## SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	\$15.50 to \$16.25
No. 1 hvy. melting	15.50 to 16.25
No. 2 hvy. melting	14.50 to 15.25
No. 2 bales	13.50 to 14.25
No. 3 bales	9.50 to 10.50
Mach. shop turn.	7.00
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

## LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$14.50 to \$15.50
No. 2 hvy. melting	13.50 to 14.50
No. 2 bales	12.50 to 13.50
No. 3 bales	9.00 to 10.00
Mach. shop turn.	4.00
No. 1 cupola cast.	19.00 to 21.00

## SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	\$14.50
No. 1 hvy. melting	14.50*
No. 3 bundles	11.50
Elec. furn. 1 ft. und.	17.00
No. 1 cupola cast.	20.00*



# Comparison of Prices . .

Advances Over Past Week in Heavy Type; Declines in *Italics*. Prices are F.O.R. Major Basing Points. The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 152-162.

Flat Rolled Steel:	May 8, 1945	May 1, 1945	Apr. 3, 1945	May 9, 1944
(Cents Per Lb.)				
Hot rolled sheets.....	2.20	2.20	2.20	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.65	3.65	3.65	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates.....	2.20	2.20	2.20	2.10
Plates, wrought iron.....	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate:	May 8, 1945	May 1, 1945	Apr. 3, 1945	May 9, 1944
(Dollars Per Base Box)				
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic....	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes:	May 8, 1945	May 1, 1945	Apr. 3, 1945	May 9, 1944
(Cents Per Lb.)				
Merchant bars.....	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars.....	2.70	2.70	2.70	2.70
Structural shapes.....	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00
Wrought iron bars.....	4.40	4.40	4.40	4.40

Wire and Wire Products:	May 8, 1945	May 1, 1945	Apr. 3, 1945	May 9, 1944
(Cents Per Lb.)				
Plain wire.....	2.60	2.60	2.60	2.60
Wire nails.....	2.80	2.80	2.80	2.55

Rails:	May 8, 1945	May 1, 1945	Apr. 3, 1945	May 9, 1944
(Dollars Per Gross Ton)				
Heavy rails.....	\$43.00	\$43.00	\$43.00	\$40.00
Light rails.....	43.00	43.00	43.00	40.00

Semi-Finished Steel:	May 8, 1945	May 1, 1945	Apr. 3, 1945	May 9, 1944
(Dollars Per Gross Ton)				
Re-rolling billets.....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars.....	34.00	34.00	34.00	34.00
Slabs, re-rolling.....	34.00	34.00	34.00	34.00
Forging billets.....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp:	May 8, 1945	May 1, 1945	Apr. 3, 1945	May 9, 1944
(Cents Per Lb.)				
Wire rods.....	2.00	2.00	2.00	2.00
Skelp.....	1.90	1.90	1.90	1.90

Latest steel interim price increase authorized by OPA effective Jan. 11, 1945.

Pig Iron:	May 8, 1945	May 1, 1945	Apr. 3, 1945	May 9, 1944
(Per Gross Ton)				
No. 2 fdy., Philadelphia...	\$26.84	\$26.84	\$26.84	\$25.84
No. 2, Valley furnace....	25.00	25.00	25.00	24.00
No. 2, Southern, Cin'ti...	26.11	26.11	26.11	25.11
No. 2, Birmingham.....	21.38	21.38	21.38	20.38
No. 2, foundry, Chicago†	25.00	25.00	25.00	24.00
Basic, del'd eastern Pa...	26.34	26.34	26.34	25.34
Basic, Valley furnace....	24.50	24.50	24.50	23.50
Malleable, Chicago†....	25.00	25.00	25.00	24.00
Malleable, Valley.....	25.00	25.00	25.00	24.00
L. S. charcoal, Chicago*	42.34	42.34	42.34	37.34
Ferromanganese†.....	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60c. per ton.  
† For carlots at seaboard.

Last pig iron price change authorized by OPA effective Feb. 14, 1945.

\* Charcoal price increase retroactive to March 7, on contracts to Feb. 13.

Scrap:	May 8, 1945	May 1, 1945	Apr. 3, 1945	May 9, 1944
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	20.00
No. 1 cast, Chicago.....	20.00	20.00	20.00	20.00

Coke, Connellsville:	May 8, 1945	May 1, 1945	Apr. 3, 1945	May 9, 1944
(Per Net Ton at Oven)				
Furnace coke, prompt...	\$7.00	\$7.00	\$7.00	\$7.00
Foundry coke, prompt...	8.25	8.25	8.25	8.25

Non-Ferrous Metals:	May 8, 1945	May 1, 1945	Apr. 3, 1945	May 9, 1944
(Cents Per Lb. to Large Buyers)				
Copper, electro., Conn....	12.00	12.00	12.00	12.00
Copper, Lake.....	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	52.00
Zinc, East St. Louis.....	8.25	8.25	8.25	8.25
Lead, St. Louis.....	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd..	15.00	15.00	15.00	15.00
Nickel, electrolytic.....	35.00	35.00	35.00	35.00
Magnesium, ingot.....	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex...	14.50	14.50	14.50	14.50

# Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue.

FINISHED STEEL				PIG IRON		SCRAP STEEL	
May 8, 1945	2.25839c. a Lb.			\$24.61 a Gross Ton		\$19.17 a Gross Ton	
One week ago	2.25839c. a Lb.			\$24.61 a Gross Ton		\$19.17 a Gross Ton	
One month ago	2.25839c. a Lb.			\$24.61 a Gross Ton		\$19.17 a Gross Ton	
One year ago	2.30329c. a Lb.			\$23.61 a Gross Ton		\$19.17 a Gross Ton	
HIGH		LOW		HIGH	LOW	HIGH	LOW
1945	2.25839c., Jan. 16	2.21189c., Jan. 2	2	\$24.61, Feb. 20	\$23.61, Jan. 2	\$19.17	\$19.17
1944	2.30837c., Sept. 5	2.21189c., Oct. 5	5	\$23.61	\$23.61	19.17	\$15.67, Oct. 24
1943	2.25513c.	2.25513c.		23.61	23.61	19.17	19.17
1942	2.26190c.	2.26190c.		23.61	23.61	19.17	19.17
1941	2.43078c.	2.43078c.		\$23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16		23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16		22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18		23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4		23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 8
1936	2.32263c., Dec. 28	2.05200c., Mar. 10		19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8		18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2		17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2		16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1		14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99626c., Jan. 13	1.86586c., Dec. 29		15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9		18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29		18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 23, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.





## HERE'S ONE WAY OF *Raising Cane* THAT'S HELPING US WIN THE WAR

**R**AISSING CANE in Louisiana is mighty important war work. For here it means nursing cane plants to towering maturity so that sucrose can be extracted from their stems and refined into precious sugar (it's rationed, you know!).

Naturally, planters were asked to grow more cane when war began. But how—in the face of a desperate shortage of labor for cultivating? The answer was easy—for those who could get Sizz-Weeders. For this amazing new implement, working two rows at a time, spits flame from four burners against all grass about the plants . . . kills it *without* harming the stalks. It cultivates 17 to 20 acres per day, work that would require a whole crew of men with hoes. And it does this at one-third the cost of hand labor!

For supplying compressed air to the burners of its Sizz-

Weeders as an aid to combustion, Thomson Machinery Company, Labadieville, Louisiana, finds DeVilbiss Air Compressors dependable and economical. Operating continuously, as no air reservoir is used, these compressors are performing a tough job so efficiently they have made solid friends wherever they help work the cane.

Precision-built air compressors by DeVilbiss are distinguishing themselves today in countless other just-as-vital war jobs—including the supplying of compressed air for the famous, high-speed DeVilbiss Spray Painting Systems. In air compressors, as in spray equipment, exhaust systems, hose and connections, DeVilbiss means highest possible quality. Specify DeVilbiss next time and see!

**THE DEVILBISS COMPANY, TOLEDO 1, OHIO**

Canadian Plant: Windsor, Ontario



# DEVILBISS

## *Spray Systems*

**SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS**

# Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb. unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per 100 lb. under base; primes, 25c. above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire. (15) Deduct 10c. per 100 lb. for plates not produced to sheared mill or universal mill width and length tolerances.

Basing Point Product	DELIVERED TO														
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	Detroit	New York	Phila- delphia
<b>SHEETS</b>															
Hot rolled	2 20¢	2 20¢	2 20¢	2 20¢	2 20¢	2 20¢	2 20¢	2.20¢	2 30¢	2 20¢		2 75¢	2 30¢	2 44¢	2 37¢
Cold rolled <sup>1</sup>	3 05¢	3 05¢	3 05¢	3 05¢		3 05¢	3 05¢		3 15¢	3 05¢		3 70¢	3 15¢	3 39¢	3 37¢
Galvanized (24 gage)	3 65¢	3 65¢	3 65¢		3 65¢	3 65¢	3 65¢	3 65¢	3 75¢	3 65¢		4 20¢		3 39¢	3 82¢
Enameling (20 gage)	3 35¢	3 35¢	3 35¢	3 35¢			3 35¢		3 45¢	3 35¢		4.00¢	3 45¢	3 71¢	3 67¢
Long ternes <sup>2</sup>	3 80¢	3 80¢	3 80¢									4.55¢		4 16¢	4 12¢
<b>STRIP</b>															
Hot rolled <sup>3</sup>	2.10¢	2 10¢	2.10¢	2 10¢	2.10¢		2 10¢			2 10¢		2.75¢	2 20¢	2 46¢	
Cold rolled <sup>4</sup>	2 80¢	2 90¢		2 80¢			2 80¢		(Worcester=3.00¢)				2 90¢	3 16¢	
Cooperage stock	2 20¢	2 20¢			2 20¢		2 20¢							2.56¢	
Commodity C-R	2 05¢	3 05¢		2 95¢			2 95¢		(Worcester=3.35¢)				3 05¢	3 31¢	
<b>TIN PLATE</b>															
Standard cokes, base box	\$5 00	\$5 00	\$5 00						\$5 10					5.36¢	5 32¢
Electro, box	0 25 lb. \$4 35 0 50 lb. \$4 50 0 75 lb. \$4 65	\$4 35 \$4 50 \$4 65	\$4 35 \$4 50 \$4 65						\$4 60 \$4 75						
<b>BLACK PLATE</b>															
29 gage <sup>5</sup>	3 05¢	3 05¢	3 05¢						3 15¢			4 05¢ <sup>13</sup>			3 37¢
<b>TERNES, MFG.</b>															
Special coated, base box	\$4 30	\$4 30	\$4 30						\$4 40						
<b>BAR</b>															
Carbon steel	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢			(Duluth=2.25¢)	2 50¢	2 80¢	2 25¢	2 49¢	2 47¢	
Rail steel <sup>6</sup>	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢				2 50¢	2 80¢				
Reinforcing (billet) <sup>7</sup>	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢		2 50¢	2 55¢ <sup>13</sup>	2 25¢	2 39¢		
Reinforcing (rail) <sup>7</sup>	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢			2 50¢	2 55¢ <sup>13</sup>	2 25¢		2 47¢	
Cold finished <sup>8</sup>	2 65¢	2 65¢	2 65¢	2 65¢		2 65¢			(Detroit=2.70¢)	(Toledo=2.80¢)			2 99¢	2 97¢	
Alloy, hot rolled	2 70¢	2 70¢				2 70¢			(Bethlehem, Massillon, Canton=2.70¢)				2 80¢		
Alloy, cold drawn	3 35¢	3 35¢	3 35¢	3 35¢		3 35¢							3 45¢		
<b>PLATES</b>															
Carbon steel <sup>10</sup>	2 20¢	2 20¢	2 20¢	2 20¢	2 20¢	2 20¢	2 20¢	2 20¢	(Catesville and Claymont=2.20¢)	2 45¢	2 55¢	2 75¢	2 42¢	2 39¢	2 25¢
Floor plates	3 35¢	3 35¢									3 70¢	4 00¢		3 71¢	3 67¢
Alloy	3 50¢	3 50¢							(Catesville=3.50¢)		3 95¢	4 15¢		3 70¢	3 59¢
<b>SHAPES</b>															
Structural	2 10¢	2 10¢	2 10¢		2 10¢	2 10¢			(Bethlehem=2 10¢)		2 45¢	2 75¢		2 27¢	2 21¢
<b>SPRING STEEL, C-R</b>															
0.26 to 0.50 Carbon	2 80¢			2 80¢					(Worcester=3.00¢)						
0.51 to 0.75 Carbon	4 30¢			4 30¢					(Worcester=4.50¢)						
0.76 to 1.00 Carbon	6 15¢			6 15¢					(Worcester=6.35¢)						
1.01 to 1.25 Carbon	8 35¢			8 35¢					(Worcester=8.55¢)						
<b>WIRE</b> <sup>9</sup>															
Bright <sup>14</sup>	2.80¢	2.60¢		2 60¢	2 60¢				(Worcester=2.70¢)	(Duluth=2.65¢)		3.10¢			2.92¢
Galvanized															
Spring (High Carbon)	3 20¢	3 20¢		3 20¢					(Worcester=3.30¢)			3 70¢			3 52¢
<b>PILING</b>															
Steel Sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

## EXCEPTIONS TO PRICE SCHED. NO. 6.

Slabs, per gross ton—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. \$41; Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Granite City Steel \$47.50; Kaiser Co. (rerolling) \$58.64, (forging) \$64.64, f.o.b. Los Angeles.

Blooms, per gross ton—Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Phx. Steel Co. (rerolling) \$38.25, (forging) \$44.25; Wheeling

Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) \$58.64, (forging) \$64.64, (shell steel) \$74.64 f.o.b. Los Angeles.

Sheet Bar, per gross ton—Empire Sheet & Tin Plate Co. \$39 mill; Wheeling Steel Corp. \$38 Portsmouth, Ohio.

Billets, Forging, per gross ton—Andrews Steel Co. \$50 basing pts.; Follansbee Steel Corp. \$49.50 Toronto, Ohio; Phoenix Iron Co. \$47 mill; Geneva Steel Co. \$64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. \$49.50; Kaiser

Co. \$64.64, (shell steel) \$74.64, f.o.b. Los Angeles.

Billets, Rerolling, per gross ton—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) \$41 mill; Wheeling Steel Corp. 4 in. sq. or larger \$37.75, smaller \$39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at \$39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Contin-

## PRICES

tal Steel Corp. (1½ x 1½) \$39.50, (2 x 2) \$40.60 Kokomo, Ind. (these prices include \$1 size extra); Keystone Steel & Wire Co. \$36.40 Peoria; Connors Steel Co. \$50.60 Birmingham; Ford Motor Co. \$34 Dearborn, Mich.; Geneva Steel Co. \$58.64 f.o.b. Pacific Coast; Pgh. Steel Co. \$43.50; Kaiser Co. \$58.64 f.o.b. Los Angeles.

Structural Shapes—Phoenix Iron Co. 2.35c. basing pts. (export) 2.50c. Phoenixville; Knoxville Iron Co. 2.30c. basing points; Kaiser Co. 3.20c. f.o.b. Los Angeles.

Rails, per gross ton—Sweet Steel Co. (rail steel) \$50 mill; West Virginia Rail Co. (light-weight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp., \$45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. 2.65c. mill; Knoxville Iron Co. 2.25c. basing pts.; Kaiser Co. and Geneva Steel Co. 3.20c. Pacific Ports; Central Iron and Steel Co. 2.50c. basing points; Granite City Steel Co. 2.35c. Granite City.

Merchant Bars—W. Ames Co., 10 tons and over, 2.85c. mill; Eckels-Nye Steel Corp. 2.50c. basing pts. (rail steel) 2.40c.; Phoenix Iron Co. 2.40c. basing pts.; Sweet Steel Co. (rail steel) 2.33c. mill; Joslyn Mfg. & Supply Co., 2.35c. Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar), 2.35c. Chicago; Knoxville Iron Co., 2.30c. basing pts.; Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill.; Milton Mfg. Co., 2.75c. f.o.b. Milton, Pa.

Pipe Skelp—Wheeling Steel Corp., Benwood, 2.05c.

Reinforcing Bars—W. Ames & Co., 10 tons and over, 2.85c. mill; Sweet Steel Co. (rail steel), 2.33c. mill; Columbia Steel Co., 2.50c. Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/1 freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/1 freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/1 freight Buffalo to plants, f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/1 freight Buffalo to Readville, Mass., f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/1 freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co., for delivery except Texas and Okla., Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co., shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co., 2.30c. Chicago; Knoxville Iron Co., 2.25c. basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., 2.25c. Parkersburg.

Galvanized Sheets—Andrews Steel Co. 3.75c. basing pts.; Parkersburg Iron & Steel Co., 3.85c. Parkersburg; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is 2.45c. per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

Wire Products—Pittsburgh Steel Co., f.o.b. Pittsburgh, per 100 lb., rods, No. 5 to 9/32 in., 2.20c.; rods, heavier than 9/32, 2.35c.; bright wire, 2.725c.; bright nails, 2.90c.; lead and furnace annealed wire, 2.85c.; pot annealed wire, 2.85c.; galvanized barbed wire, 3.90c.; plain staples, 2.55c.; galvanized staples, 2.65c.; bright spring wire, 3.30c.; galvanized spring wire, 3.45c.

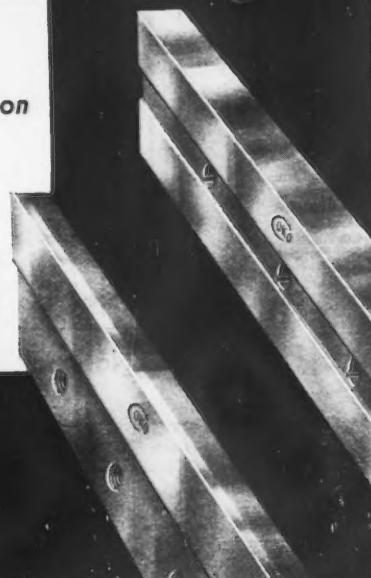
# OHIO SHEARS

**SOLID STEEL—all grades**

**LAID STEEL—hi-speed and carbon**

**ROTARY SHEARS and SLITTERS**

**The OHIO KNIFE Co.**  
CINCINNATI 23,  
OHIO



**A.I.S.I. HY-TEN S.A.E.**  
**N.E.**

## ALLOY STEELS FOR VICTORY

Scientifically selected to conserve critical alloys and meet the requirements of the AIRCRAFT, ORDNANCE, and MACHINE TOOL industries.

Complete "EARMARKED" stocks of Aircraft alloy steels at Buffalo and Detroit.

**WHELOCK, LOVEJOY & CO., INC.**

126 Sidney Street

Cambridge 39, Mass.

Cleveland 14, Chicago 23, Newark 5, Detroit 3, Buffalo 10, Cincinnati 32



# PRICES

## WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates 1/2 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE8617-20	Hot Rolled, NE9442-45 Ann.	Cold Drawn, NE8617-20	Cold Drawn, NE9442-45 Ann.
Philadelphia	\$3.618	\$4.872 <sup>a</sup>	\$5.168 <sup>a</sup>	\$3.922	\$4.772	\$3.705	\$3.686	\$3.822	\$4.072	\$5.968	\$7.066	\$7.272	\$8.322
New York	3.690	4.613 <sup>a</sup>	5.160	3.974 <sup>a</sup>	4.772	3.868	3.758	3.853	4.103	5.858	6.908	7.103	8.203
Boston	3.844	4.744 <sup>a</sup>	5.374 <sup>a</sup>	4.106	4.715	4.012	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.494	4.852	5.044	3.902	4.752	3.694	3.759	3.802	4.052				
Norfolk	3.971	4.965	5.521	4.165	4.865	4.071	4.002	4.065	4.185				
Chicago	3.35	4.20	5.381	3.80	4.651 <sup>7</sup>	3.65	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.487	4.337 <sup>a</sup>	5.422 <sup>a</sup>	3.737	4.787 <sup>17</sup>	3.787	3.687	3.637	3.887	5.987	7.087	7.087	8.137
Cleveland	3.45	4.40	5.027 <sup>a</sup>	3.60	4.45	3.50	3.588	3.35	3.75	5.956	7.056	6.85	7.90
Buffalo	3.45	4.40	4.90 <sup>a</sup>	3.819	4.669	3.73	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.55	4.50	5.15 <sup>a</sup>	3.70	4.688 <sup>17</sup>	3.709	3.661	3.45	3.80	6.08	7.18	7.159	8.209
Cincinnati	3.525	4.475 <sup>a</sup>	5.475 <sup>a</sup>	3.675	4.711	3.711	3.691	3.611	4.011				
St. Louis	3.497	4.347 <sup>a</sup>	5.322 <sup>a</sup>	3.747	4.631 <sup>17</sup>	3.797	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.45	4.40	4.90	3.60	4.45	3.50	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.561	4.48	5.407 <sup>a</sup>	3.86	4.731 <sup>17</sup>	3.913	3.813	3.763	4.361	6.09	7.19	7.581	8.711
Omaha	3.965	5.443	5.758 <sup>a</sup>	4.215	4.265	4.165	4.115	4.43					
Indianapolis	3.68	5.58	4.718	4.918	3.768	4.88	3.63	3.58	3.98	6.08	7.18	7.18	8.23
Birmingham	3.55		4.90	3.70		3.65	3.55	3.50	4.43				
Memphis	4.965 <sup>7</sup>	4.86	3.415	4.215		4.165	4.065	4.015	4.33				
New Orleans	4.158 <sup>a</sup>	4.95	5.508	4.308		4.258	4.158 <sup>a</sup>	4.108 <sup>a</sup>	4.629				
Houston	3.863	5.573	6.463 <sup>1</sup>	4.313		4.35	4.25	3.75	6.373 <sup>a</sup>	7.223	8.323	8.323	9.373
Los Angeles	5.10	7.20 <sup>a</sup>	6.25 <sup>a</sup>	4.95	5.613 <sup>15</sup>	5.05	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.651 <sup>4</sup>	7.30 <sup>a</sup>	6.50 <sup>a</sup>	4.501 <sup>4</sup>	7.333 <sup>17</sup>	4.751 <sup>4</sup>	4.351 <sup>4</sup>	4.151 <sup>4</sup>	5.333	8.304	9.404	9.404	10.454
Seattle	4.751 <sup>2</sup>	7.05 <sup>a</sup>	6.10 <sup>a</sup>	4.251 <sup>2</sup>		4.851 <sup>2</sup>	4.451 <sup>2</sup>	4.351 <sup>2</sup>	5.783				
Portland	4.751 <sup>1</sup>	6.80 <sup>a</sup>	5.90 <sup>a</sup>	4.751 <sup>1</sup>		4.851 <sup>1</sup>	4.451 <sup>1</sup>	4.451 <sup>1</sup>	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.631 <sup>7</sup>		6.321 <sup>8</sup>	5.531 <sup>7</sup>		5.081 <sup>7</sup>	4.981 <sup>7</sup>	4.881 <sup>7</sup>	5.90				

## National Emergency Steels MILL EXTRAS

Designa- tion	Basic Open-Hearth		Electric Furnace		Designa- tion	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 8612	0.85 <sup>a</sup>	\$13.00	\$1.15	\$23.00	NE 9427	0.75 <sup>a</sup>	\$18.00	\$1.25	\$25.00
NE 8615	0.85	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 8617	0.85	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8620	0.85	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8622	0.85	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8625	0.85	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8627	0.85	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8630	0.85	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8632	0.85	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8635	0.85	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8637	0.85	13.00	1.15	23.00					
NE 8640	0.85	13.00	1.15	23.00	NE 9722	0.65	13.00	1.15	23.00
NE 8642	0.85	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8645	0.85	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8647	0.85	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
NE 8650	0.85	13.00	1.15	23.00	NE 9742	0.65	13.00	1.15	23.00
					NE 9745	0.65	13.00	1.15	23.00
NE 8712	0.70	14.00	1.20	24.00	NE 9747	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8720	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00
NE 8722	0.70	14.00	1.20	24.00					
NE 8725	0.70	14.00	1.20	24.00	NE 9830	1.30	26.00	1.80	36.00
NE 8727	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9835	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8747	0.70	14.00	1.20	24.00					
NE 8750	0.70	14.00	1.20	24.00					
					NE 9912	1.20	24.00	1.55	31.00
NE 9415	0.75	15.00	1.25	25.00	NE 9915	1.20	24.00	1.55	31.00
NE 9417	0.75	15.00	1.25	25.00	NE 9917	1.20	24.00	1.55	31.00
NE 9420	0.75	15.00	1.25	25.00	NE 9920	1.20	24.00	1.55	31.00
NE 9422	0.75	15.00	1.25	25.00	NE 9922	1.20	24.00	1.55	31.00
NE 9425	0.75	15.00	1.25	25.00	NE 9925	1.20	24.00	1.55	31.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, AISI Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and \$5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of \$2.70 for 100 lb. on finished products and \$54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

## BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(\*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

\*Add 0.271c. for sizes not rolled in Birmingham.

\*\*City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

## LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports\*)

Per Gross Ton

Old range, bessemer, 51.50 ..... \$4.75

Old range, non-bessemer, 51.50 ..... 4.60

Mesaba, bessemer, 51.50 ..... 4.60

Mesaba, non-bessemer, 51.50 ..... 4.45

High phosphorus, 51.50 ..... 4.35

\*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

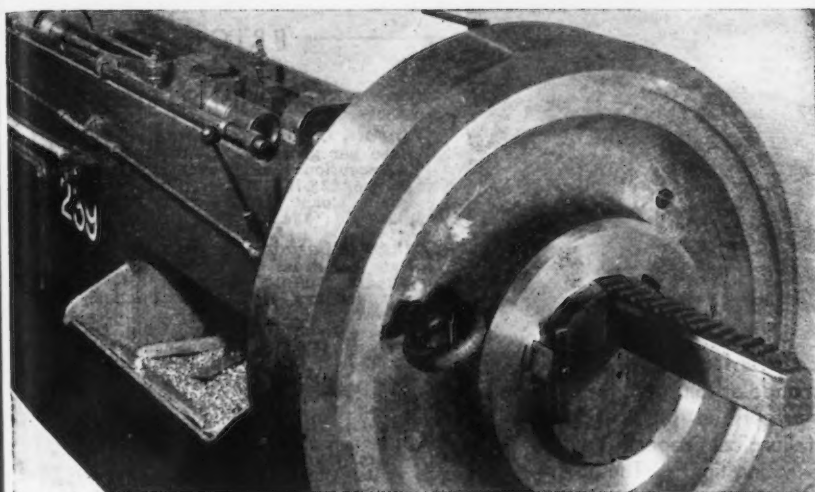
## FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

### Exception

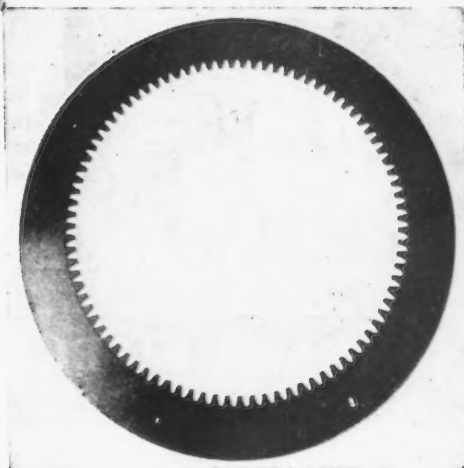
When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluor spar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF <sub>2</sub> Content:	Base price per short ton
70% or more	\$23.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00



*Left.* Broaching these large splines one at a time on a Colonial Universal Horizontal proved the lowest cost process for machining them. These 12" I. D. splines had to be held to exceptionally close tolerances (0.0005 total spacing error).

*Below.* Teeth on these clutch discs are broached 9 teeth at a time, indexing between cuts, but 13 discs are broached at one set-up. Broach cost is much less, output actually larger. Machine and broaches are Colonials.



# How much does Broaching cost?


The answer to that question lies in "how" you broach it. In *high* production the major factors usually are machine time and broach life. Frequently a slightly higher machine and broach cost will be negligible compared with lower tool and time costs per piece and greater precision obtained.

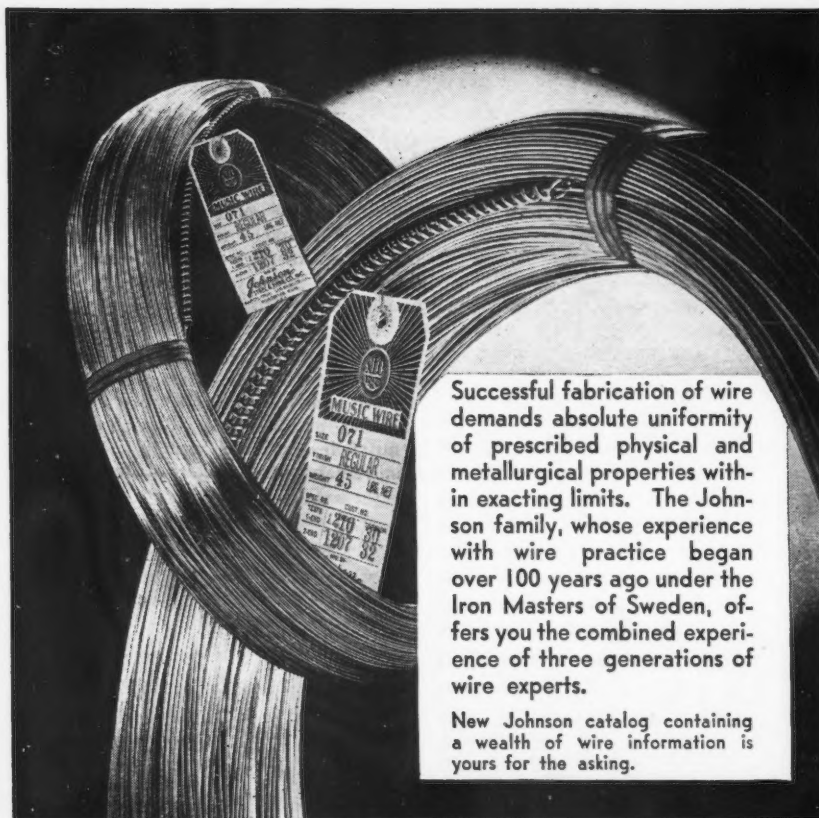
For *shorter* runs "how" you broach it becomes increasingly important. Here, Colonial engineers have frequently found it possible to cut broach costs way down by designing a simple broach which machines the part in several passes instead of one. True, output in pieces per hour may be less, but it is still so high compared to other methods that the saving is very large.

Are you missing a bet? Colonial engineers will be glad to give you their suggestions as to the most economical way to broach your job, and what it would cost, based on the widest broaching experience in Industry today.

DO YOU READ "BROACHING NEWS"? A note on your company letterhead will put you on the mailing list.

**colonial** BROACH COMPANY  
DETROIT 13, U.S.A.

Broaches  Broaching Machines - Broaching Equipment



Successful fabrication of wire demands absolute uniformity of prescribed physical and metallurgical properties with-in exacting limits. The Johnson family, whose experience with wire practice began over 100 years ago under the Iron Masters of Sweden, offers you the combined experience of three generations of wire experts.

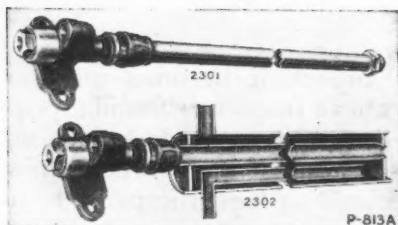
New Johnson catalog containing a wealth of wire information is yours for the asking.

## JOHNSON STEEL & WIRE CO., INC.

WORCESTER 1, MASSACHUSETTS  
NEW YORK / AKRON / CHICAGO / LOS ANGELES

### FOR ALL TYPES of INDUSTRIAL FURNACES

#### Type SA — Model OH Oil Burner



#### for firing Open Hearth Furnaces

... with any grade of fuel oil or tar, using saturated or superheated steam, or compressed air for atomization. Its venturi throat and internal mixing chamber (see illustration below) permits a wide range in capacity and flame velocity. Steam consumption is low. Continuous operation without clogging or need for cleaning. Nozzle is extendable, with or without water cooled jacket. Sizes available to give capacities up to 725 gallons per hour.

For more information about these burners write for Bulletin No. 21



Cross-Section of Type SA Oil Burner

### NATIONAL AIROIL BURNER COMPANY, INCORPORATED

1271 East Sedgley Ave., Philadelphia 34, Pa.  
ESTABLISHED 1912 INCORPORATED 1917

## NATIONAL AIROIL FUEL OIL - GAS BURNERS

Steam Atomizing Oil Burners—Mechanical Pressure Atomizing Oil Burners—Low Air Pressure Oil Burners—Motor-driven Rotary Oil Burners—Industrial Gas Burners—Combination Gas and Oil Burners—Fuel Oil Pumping Units—Fuel Oil Heaters—Fuel Oil Strainers and other accessories.

### PRICES

#### SEMI-FINISHED STEEL

##### Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill... \$31.00  
Exceptions: Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., \$34.25; Pgh. Steel Co., \$33.10.

##### Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown... \$36.00  
Exceptions: Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., \$38.10.

##### Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh... \$45.00  
Exceptions: C/L delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

##### Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12 higher. Provo, \$11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

Per Gross Ton  
Rerolling... \$34.00  
Forging quality... 40.00

For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

##### Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton... \$54.00  
Price delivered Detroit \$2.00 higher; East Michigan, \$3.00 higher.

##### Shell Steel

Per Gross Ton  
3 in. to 12 in. .... \$52.00  
12 in. to 18 in. .... 54.00  
18 in. and over .... 56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are \$2.00 higher; East Michigan, \$3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at \$13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of \$52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

##### Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

Per Gross Ton  
Open hearth or bessemer ..... \$34.00

##### Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.  
Grooved, universal and sheared .. 1.90c.

##### Wire Rods

(No. 5 to 9/32 in.)

Per Lb.  
Pittsburgh, Chicago, Cleveland ... 2.00c.  
Worcester, Mass. .... 2.10c.  
Birmingham .... 2.00c.  
San Francisco .... 2.50c.  
Galveston .... 2.25c.  
9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extra apply.

##### TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

Base per lb.

High speed ..... 67c.  
Straight molybdenum ..... 54c.  
Tungsten-molybdenum ..... 57 1/2c.  
High-carbon-chromium ..... 43c.  
Oil hardening ..... 24c.  
Special carbon ..... 22c.  
Extra carbon ..... 18c.  
Regular carbon ..... 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.





DESIGNED  
SPECIFICALLY FOR  
**AC WELDING**  
of CAST IRON

*Announcing a New*

# P & H "HARCAST"

**Entirely New... Entirely Different!**

● Perhaps you've wondered why such an all-around electrode for welding cast iron was not available. So did P&H research engineers. And they went to work on it!

It took nearly three years. But now it's ready... ready to end your worries about weld cracks, poor penetration, excess porosity or pulling away at the fusion zone. It produces sound, dense welds with a tensile strength of 60,000 lbs. p.s.i.—approximately twice that of a good grade of cast iron. And it fuses well with mild or medium carbon steels for joining to cast iron.

## Can Be Used at Low Amperages

Low amperage welding with "Harcast" mini-

mizes the dilution at the fusion zone, improves machining qualities. It's easy to use, too, for single or multiple pass work. But its operating characteristics are entirely different.

## An All-position Electrode — for Both AC and DC Welding

You can use P&H "Harcast" in all positions; downhand, vertical or overhead. Although designed primarily for AC welding, it works equally well on DC. But why not get full information? Try it yourself and see the difference! Write for literature.

### A COMPLETE ARC WELDING SERVICE



**P & H**

**HARNISCHFEGER**

**CORPORATION**

HOISTS • WELDING ELECTRODES • MOTORS • EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

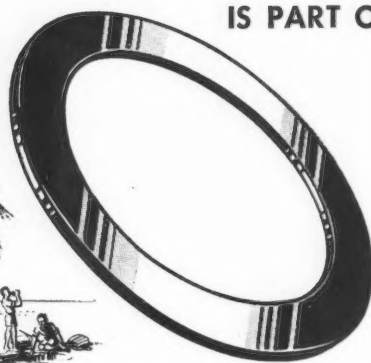
**WELDING  
ELECTRODES**

4401 W. National Avenue,  
Milwaukee 14, Wis.

# This KING Flange

IS PART OF A MAN-MADE

# OASIS



In the majority of cases we don't know to what final use a King Ring or Flange is put. In this case we do know—we know it becomes an accurate, true-fitting gasket for evaporators which convert sea water or water from uncertain sources into pure, disease-free fluid. So—there's drama in even this remote connection with winning the war. King is proud of its product and the job it's doing to speed victory. King bends, you know, standard rings and flanges or custom-made products from 288 varieties of bar stock.

## KING FIFTH WHEEL COMPANY



2917 N. SECOND STREET, PHILADELPHIA 33, PA.



## You Can Depend On "Hercules" (Red Strand) Wire Rope

### Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • Results are what count, and the performance record of this wire rope continues to make and hold friends.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

## A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS  
5909 KENNERLY AVENUE

NEW YORK • • • 90 West Street  
CHICAGO • • • 810 W. Washington Blvd.  
DENVER • • • 1534 Wazoo Street



SAN FRANCISCO • • • 520 Fourth Street  
PORTLAND • • • 914 N. W. 14th Avenue  
SEATTLE • • • 3410 First Avenue South

## PRICES

### WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills  
(F.o.b. Pittsburgh only on wrought pipe)  
Base Price—\$200.00 per Net Ton

#### Steel (Butt Weld)

	Black	Galv.
1/2 in. ....	63 1/2	51
3/4 in. ....	66 1/2	55
1 to 3 in. ....	68 1/2	57 1/2

#### Wrought Iron (Butt Weld)

1/2 in. ....	24	3 1/2
3/4 in. ....	30	10
1 and 1 1/2 in. ....	34	16
1 1/2 in. ....	38	18 1/2
2 in. ....	37 1/2	18

#### Steel (Lap Weld)

2 in. ....	61	49 1/2
2 1/2 in. and 3 in. ....	64	52 1/2
3 1/2 to 6 in. ....	66	54 1/2

#### Wrought Iron (Lap Weld)

2 in. ....	30 1/2	12
2 1/2 to 3 1/2 in. ....	31 1/2	14 1/2
4 in. ....	33 1/2	18
4 1/2 to 8 in. ....	32 1/2	17

#### Steel (Butt, extra strong, plain ends)

1/2 in. ....	61 1/2	50 1/2
3/4 in. ....	65 1/2	54 1/2
1 to 3 in. ....	67	57

#### Wrought Iron (Same as Above)

1/2 in. ....	25	6
3/4 in. ....	31	12
1 to 2 in. ....	38	19 1/2

#### Steel (Lap, extra strong, plain ends)

2 in. ....	59	48 1/2
2 1/2 and 3 in. ....	63	52 1/2
3 1/2 to 6 in. ....	66 1/2	56

#### Wrought Iron (Same as Above)

2 in. ....	33 1/2	15 1/2
2 1/2 to 4 in. ....	39	23 1/2
4 1/2 to 6 in. ....	37 1/2	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

### CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago . . .	\$54.80
6-in. and larger, del'd New York . .	52.20
6 in. and larger, Birmingham . . .	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles . . .	69.40
6-in. and larger f.o.b. cars, Seattle .	71.20
Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 percent tax on freight rates.	

### BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless Cold Drawn	Lap Weld Hot Rolled
2 in. o.d. 13 B.W.G. . . . .	15.03	12.04
2 1/2 in. o.d. 12 B.W.G. . . . .	20.21	17.54
3 in. o.d. 12 B.W.G. . . . .	22.48	19.50
3 1/2 in. o.d. 11 B.W.G. . . . .	25.37	24.62
4 in. o.d. 10 B.W.G. . . . .	35.20	30.54
(Extras for less carload quantities)		
40,000 lb. or ft. and over . . . . .		
30,000 lb. or ft. to 39,999 lb. or ft. .		
20,000 lb. or ft. to 29,999 lb. or ft. .		
10,000 lb. or ft. to 19,999 lb. or ft. .		
5,000 lb. or ft. to 9,999 lb. or ft. .		
2,000 lb. or ft. to 4,999 lb. or ft. .		
Under 2,000 lb. or ft. . . . .		

## PRICES

### WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	Base per Keg	
Standard wire nails....	\$2.80	\$3.30
Coated nails .....	2.80	3.30
Cut nails, carloads ....	3.85	....
	Base per 100 lb.	
Annealed fence wire....	\$3.05	\$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence* ....	.67	.35
Fence posts, carloads...	.69	.86
Single loop bale ties....	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barbless wire..	.70	....

\*15% gage and heavier. \*\*On 80-rod spools in carload quantities.  
†Prices subject to switching or transportation charges.

### BOLTS, NUTS, RIVETS, SET SCREWS

#### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

#### Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
½ in. & smaller x 6 in. & shorter....	65½
¾ in. & 1 in. x 6 in. & shorter....	63½
1 in. to 1 ½ in. x 6 in. shorter....	61
1 ½ in. and larger, all lengths....	59
All diameters over 6 in. long....	59
Lag, all sizes .....	62
Plow bolts .....	65

#### Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller .....	62
¾ in. to 1 in. inclusive .....	59
1 in. to 1 ½ in. inclusive .....	57
1 ½ in. and larger .....	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

#### Semi-Fin. Hexagon Nuts

U.S.S. S.A.E.

Base discount less keg lots

7/16 in. and smaller .....	64
½ in. and smaller .....	62
¾ in. through 1 in. ....	60
1 in. through 1 ½ in. ....	59
1 ½ in. through 2 in. ....	57
2 in. and larger .....	56

In full keg lots, 10 per cent additional discount.

#### Stove Bolts

Consumer

Packages, nuts loose .....	71 and 10
In packages, with nuts attached....	71
In bulk .....	80

On stove bolts freight allowed up to 55c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

#### Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....

#### Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....

#### Cap and Set Screws

Consumer

Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. ....	64
Upset set screws, cup and oval points	71
Milled studs .....	46
Flat head cap screws, listed sizes....	36
Phillister head cap, listed sizes....	51

Freight allowed up to 55c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

### ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
3-lb. coating I.C....	\$6.00	\$12.00
15-lb. coating I.C....	7.00	14.00
20-lb. coating I.C....	7.50	15.00

# ERIE BUCKETS



THE COMPLETE LINE

Write for Data

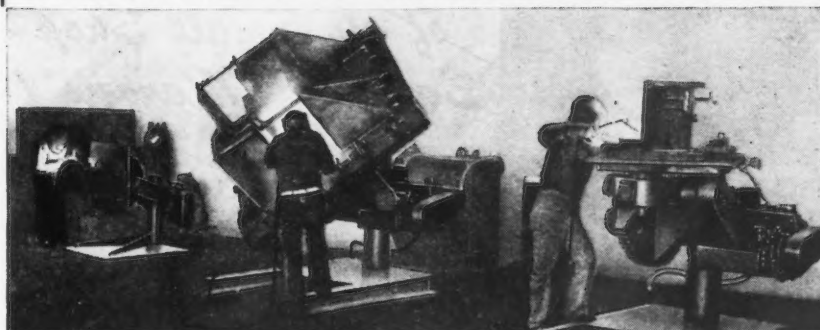
Above types built in weights and capacities to suit your crane and job requirements.

## ERIE STEEL CONSTRUCTION CO.

ERIE, PENNSYLVANIA

Aggre Meters • Buckets • Concrete Plants • Traveling Cranes

## All are C-F POSITIONERS



2500 lbs.

6000 lbs.

6000 lbs.

Modern welding specifications call for "positioned welding throughout," and today in all parts of the country, we find endless streams of war materials coming off production lines of C-F Welding Positioners. Some of these lines are blocks long and made up of identical positioners on each of which is built a complete unit. In others like the 3 positioner sub-assembly line the C-F Positioners are progressively larger as the weldment increases in size and weight. In planning your post war set-up, remember that there is a C-F Positioner exactly suited to every requirement, that each is a universal tool, operated by the welder himself by push button or hand wheel control, that are all adjustable for height, all rotate a full 360°, all tilt 135° beyond horizontal.

other C-F Positioner capacities:

1,200 lb.  
14,000 lb.  
20,000 lb.  
30,000 lb.

Write for Bulletin WP-22

## CULLEN-FRIESTEDT CO.

1303 South Kilbourn Avenue

Chicago 23, Ill.



# PIG IRON PRICES

BASING POINT* BASE PRICES						DELIVERED PRICES† (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	\$25.50	\$26.00	\$26.50	\$27.00	.....	Boston	Everett	\$ .50	\$26.00	\$26.50	\$27.00	\$27.50	.....
Birdsboro	25.58	26.00	26.50	27.00	\$30.50	Boston	Birdsboro-Steelton	4.02	.....	.....	.....	.....	\$34.52
Birmingham	20.00	21.38	.....	26.00	.....	Brooklyn	Bethlehem	2.50	28.00	28.50	29.00	29.50	.....
Buffalo	24.00	25.00	25.50	26.00	30.50	Brooklyn	Birdsboro	2.92	.....	.....	.....	.....	33.42
Chicago	24.50	25.00	25.00	25.50	.....	Canton	Cleveland	1.39	25.89	26.39	26.39	26.89	.....
Cleveland	24.50	25.00	25.00	25.50	.....	Canton	Buffalo	3.19	.....	.....	.....	.....	33.69
Detroit	24.50	25.00	25.00	25.50	.....	Cincinnati	Birmingham	4.06	24.06	25.44	.....	.....	.....
Duluth	25.00	25.50	25.50	26.00	.....	Cincinnati	Hamilton	1.11	.....	.....	26.11	.....	.....
Erie	24.50	25.00	25.50	26.00	.....	Cincinnati	Buffalo	4.40	.....	.....	.....	.....	34.90
Everett	25.50	26.00	26.50	27.00	.....	Jersey City	Bethlehem	1.53	27.03	27.53	28.03	28.53	.....
Granite City	24.50	25.00	25.00	25.50	.....	Jersey City	Birdsboro	1.94	.....	.....	.....	.....	32.44
Hamilton	24.50	25.00	25.00	.....	.....	Los Angeles	Provo	4.95	27.45	27.95	.....	.....	.....
Neville Island	24.50	25.00	25.00	25.50	.....	Los Angeles	Buffalo	15.41	.....	.....	.....	.....	45.91
Provo	22.50	23.00	.....	.....	.....	Mansfield	Cleveland & Toledo	1.94	26.44	26.94	26.94	27.44	.....
Sharpsville 1	24.50	25.00	25.00	25.50	.....	Mansfield	Buffalo	3.36	.....	.....	.....	.....	33.86
Sparrows Point	25.50	26.00	.....	.....	.....	Philadelphia	Swedeand	.84	26.34	26.84	27.34	27.84	.....
Steelton	25.50	.....	.....	.....	30.50	Philadelphia	Birdsboro	1.24	.....	.....	.....	.....	31.74
Swedeand	25.50	26.00	26.50	27.00	.....	San Francisco	Provo	4.95	27.45	27.95	.....	.....	.....
Toledo	24.50	25.00	25.00	25.50	.....	San Francisco	Buffalo	15.41	.....	.....	.....	.....	45.91
Youngstown	24.50	25.00	25.00	25.50	.....	Seattle	Provo	4.95	27.45	27.95	.....	.....	.....
						Seattle	Buffalo	15.41	.....	.....	.....	.....	45.91
						St. Louis	Granite City	.50	25.00	25.50	25.50	26.00	.....
						St. Louis	Buffalo	7.07	.....	.....	.....	.....	37.57

\* Maximum per gross ton, established by OPA February 14, 1945.

† Prices do not reflect 3 per cent tax on freight.

\* Maximum per gross ton, established by OPA February 14, 1945.

† Prices do not reflect 3 per cent tax on freight.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, \$33.00 and \$34.00, respectively. Newberry Brand of Lake Superior charcoal iron \$39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10, April 11, 1945, retroactive to March 7, 1945. Delivered to Chicago, \$42.34. High phosphorus iron sells at Lyles, Tenn., at \$28.50.

Basing point prices are subject to switch-

ing charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 per cent silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 per cent, C/L per G.T., f.o.b. Jackson, Ohio—\$30.50; f.o.b. Buffalo—\$31.75. Add \$1.00 per ton for each additional 0.50% Si. Add 50c. per ton for each 0.50% Mn over 1.00%. Add \$1.00 per ton for 0.75% or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

## METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

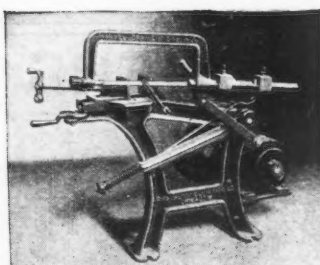
Copper, electrolytic, 150 and 200 mesh	21 1/2 to 23 1/2 c.
Copper, reduced, 150 and 200 mesh	20 1/2 to 25 1/2 c.
Iron, commercial, 100 and 200 mesh 96 + % Fe	12 1/2 to 15 c.
Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots	4 c.
Iron, hydrogen reduced, 300 mesh and finer, 98 1/2 + % Fe, drum lots	63 c.
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe 30 to 33 c.	
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42 c.
Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90 c.
Aluminum, 100 and 200 mesh	*23 to 27 c.
Antimony, 100 mesh	20.6 c.
Cadmium, 100 mesh	\$1
Chromium, 150 mesh	\$1.03
Lead, 100, 200 & 300 mesh	11 1/2 to 12 1/2 c.
Manganese, 150 mesh	51 c.
Nickel, 150 mesh	51 1/2 c.
Solder powder, 100 mesh 8 1/2 c. plus metal	
Tin, 100 mesh	58 3/4 c.
Tungsten metal powder, 98-99%, any quantity, per lb.	\$2.60
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	\$2.60
Under 100 lb.	\$3.00

\*Freight allowed east of Mississippi.

## COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.25
Foundry, By-Product	
Chicago, del'd	13.35
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.88
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Palmsville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.85
Birmingham, del'd	10.50

\*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges.



**80%**  
of all Small Shop  
Saws are "Marvels"!

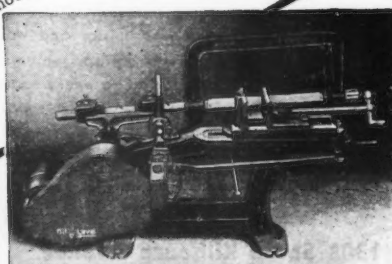
**No. 1 Draw Cut Hack Saw**  
Dry cut, 4" x 4" capacity. A sturdy saw well-known for its dependability, economy, and invaluable service in the small shop or shop department. Simple and efficient with low blade cost.

**MARVELSAWS**  
**No. 2 Draw Cut Hack Saw.** Companion to the No. 1 but with a normal 6" x 6" capacity which can be increased to 8" x 8" by shortening the stroke with adjustable crank. The No. 2 MARVEL also has a swivel vise which is removable from the "T" slotted bed, permitting special fixtures to be mounted. Both machines are available in belt and motor driven models. Motor driven models can also be furnished mounted on portable truck.

## Complete Range of Metal Sawing Machines

Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

**ARMSTRONG-BLUM MFG. CO.**  
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U. S. A.



## PRICES

### REFRACTORIES

(F.o.b. Works)

#### Fire Clay Brick

Per 1000

Super-duty brick, St. Louis.....	\$66.55
First quality, Pa., Md., Ky., Mo., Ill.	52.85
First quality, New Jersey.....	57.70
Sec. quality, Pa., Md., Ky., Mo., Ill.	47.95
Sec. quality, New Jersey.....	52.55
No. 1 Ohio .....	44.30
Ground fire clay, net ton.....	7.80

#### Silica Brick

Pennsylvania and Birmingham ...	\$52.85
Chicago District .....	60.65
Silica cement, net ton (Eastern)...	9.25

#### Chrome Brick

Per Net Ton

Standard chemically bonded, Balt.,	
Plymouth Meeting, Chester .....	\$54.00

#### Magnesite Brick

Standard, Balt. and Chester .....	\$76.00
Chemically bonded, Baltimore .....	65.00

#### Grain Magnesite

Domestic, f.o.b. Balt. and Chester	
in sacks (carloads) .....	\$43.48
Domestic, f.o.b. Chewelah, Wash.	
(in bulk) .....	22.00

### RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb.,	
No. 1 O.H., gross ton .....	\$43.00
Angle splice bars, 100 lb.....	2.70
(F.o.b. Basing Points) Per Gross Ton	
Light rails (from billets) .....	\$43.00
Light rails (from rail steel) .....	39.00
Base per Lb.	
Cut spikes .....	3.00c.
Screw spikes .....	5.15c.
Tie plate, steel .....	2.15c.
Tie plates, Pacific Coast .....	2.30c.
Track bolts .....	4.75c.
Track bolts, heat treated, to rail-	
roads .....	5.00c.
Track bolts, jobbers discount .....	63-5
Basing points, light rails, Pittsburgh,	
Chicago, Birmingham; cut spikes and tie	
plates—Pittsburgh, Chicago, Portsmouth,	
Ohio, Weirton, W. Va., St. Louis, Kansas	
City, Minnequa, Colo., Birmingham and	
Pacific Coast ports; tie plates alone—	
Steelton, Pa., Buffalo. Cut spikes alone—	
Youngstown, Lebanon, Pa., Richmond,	
Oregon and Washington ports, add 25c.	

### CORROSION AND HEAT- RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

#### Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets .....	21.25c.	20.40c.
Bars .....	25.00c.	24.00c.
Plates .....	29.00c.	27.00c.
Structural shapes .....	25.00c.	24.00c.
Sheets .....	36.00c.	34.00c.
Hot rolled strip .....	33.50c.	31.50c.
Cold rolled strip .....	30.00c.	28.00c.
Drawn wire .....	25.00c.	24.00c.

#### Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets .....	15.725c.	16.15c.	19.125c.	23.375c.
Bars .....	18.50c.	19.00c.	22.50c.	27.50c.
Plates .....	21.50c.	22.00c.	25.50c.	30.50c.
Sheets .....	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip .....	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip .....	22.00c.	22.50c.	32.00c.	52.00c.

#### Chromium-Nickel Clad Steel (20%)

	No. 304
Plates .....	18.00c.*
Sheets .....	19.00c.

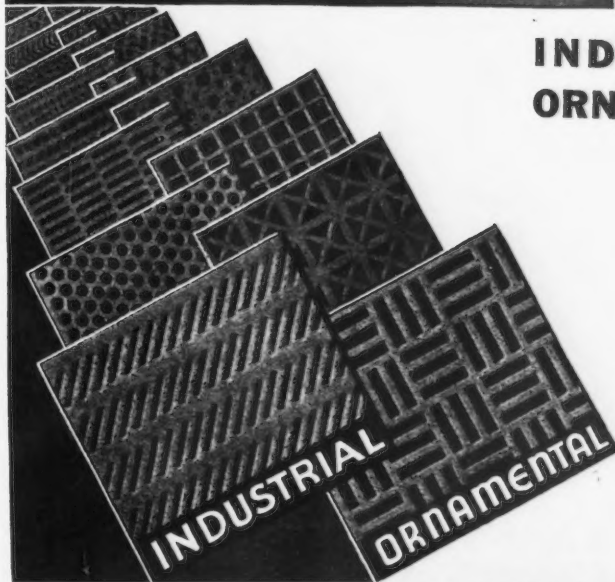
\*Includes annealing and pickling.

### ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade .....	3.20c.
Armature .....	3.55c.
Electrical .....	4.05c.
Motor .....	4.95c.
Dynamo .....	5.65c.
Transformer 72 .....	6.15c.
Transformer 65 .....	7.15c.
Transformer 58 .....	7.65c.
Transformer 52 .....	8.45c.
F.o.b. Granite City, add 10c. per 100	
lb. on field grade to and including	
dynamo. Pacific ports add 75c. per 100	
lb. on all grades.	

## PERFORATED METALS



INDUSTRIAL  
ORNAMENTAL

ANY METAL ANY PERFORATION

The  
**Harrington & King**  
PERFORATING CO.

5657 FILLMORE STREET—CHICAGO 44, ILL.  
Eastern Office: 114 Liberty Street, New York 6, N. Y.

# BELLEVUE Controlled Atmosphere FURNACES

EVERY Bellevue furnace is designed and built for a specific job. Hundreds of furnaces and repeat orders in scores of plants is evidence enough that you can have complete confidence in Bellevue engineers to solve your heat treating problems. Send for complete details.

**BELLEVUE INDUSTRIAL FURNACE CO.**  
2974 BELLEVUE AVENUE DETROIT, MICH.



### Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Tenn.  
Carload lots (bulk) ..... \$135.00  
Carload lots (packed) ..... 141.00  
Less ton lots (packed) ..... 148.50  
\$1.70 for each 1% above 82% Mn;  
penalty, \$1.70 for each 1% below 78%.

### Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.  
96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.  
Carload, bulk ..... 36c.  
L.c.l. lots ..... 38c.  
95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.  
Carload, bulk ..... 34c.  
L.c.l. lots ..... 35c.

### Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.  
16-19% Mn 19-21% Mn  
3% max. Si 2% max. Si  
Carloads ..... \$35.00 \$36.00  
Less ton ..... 47.50 48.50

### Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.  
Eastern Central Western  
Zone Zone Zone  
50% Si ... 6.65c. 7.10c. 7.25c.  
75% Si ... 8.05c. 8.30c. 8.75c.  
80-90% Si ... 8.90c. 9.05c. 9.55c.  
90-95% Si ... 11.05c. 11.20c. 11.65c.  
Spot sales add: 45c. per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb. for 80-90% and 90-95% Si.

### Silvery Iron

Silvery Iron, Silicon 14.01 to 14.50 per cent, \$45.50 per G. T. f.o.b. Jackson, Ohio. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for low impurities, not to exceed: P-0.05%, S-0.04%, C-1.00%. Covered by MPR 405.

### Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.  
Eastern Central Western  
Zone Zone Zone  
96% Si, 2% Fe. ... 13.10c. 13.55c. 16.50c.  
97% Si, 1% Fe. ... 13.45c. 13.90c. 16.80c.

96% Si, 2% Fe. ... 13.10c. 13.55c. 16.50c.  
97% Si, 1% Fe. ... 13.45c. 13.90c. 16.80c.

### Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.  
Eastern Central Western  
Zone Zone Zone  
Carload, bulk, 3.35c. 3.50c. 3.65c.  
2000 lb.-carload 3.8c. 4.2c. 4.35c.

### Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.  
Carload, bulk ..... 6.05c.  
2000 lb. to carload ..... 6.70c.  
Under 2000 lb. .... 6.90c.  
Briquets, contract, basis carlots, bulk freight allowed, per lb. ... 5.80c.  
2000 lb. to carload ..... 6.30c.  
Less ton lots ..... 6.55c.

### Ferrochrome

(65-72% Cr, 2% max. Si)  
OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.  
Eastern Central Western  
Zone Zone Zone  
0.06% C ..... 23.00c. 23.40c. 24.00c.  
0.10% C ..... 22.50c. 22.90c. 23.50c.  
0.15% C ..... 22.00c. 22.40c. 23.00c.  
0.20% C ..... 21.50c. 21.90c. 22.50c.  
0.50% C ..... 21.00c. 21.40c. 22.00c.  
1.00% C ..... 20.50c. 20.90c. 21.50c.  
2.00% C ..... 19.50c. 19.90c. 21.00c.  
66-71% Cr,  
4-10% ..... 13.00c. 13.40c. 14.00c.  
62.66% Cr,  
5-7% C ..... 13.50c. 13.90c. 14.50c.

### High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

### Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.  
Carloads, Ton Less  
Bulk Lots Ton  
0.10% max. C, 1 or 2% max. Si 23.00c. 23.40c. 23.65c.  
0.15% max. C, 1 or 2% max. Si 22.00c. 22.40c. 22.65c.  
0.30% max. C, 1 or 2% max. Si 21.00c. 21.40c. 21.65c.  
0.50% max. C, 1 or 2% max. Si 20.00c. 20.40c. 20.65c.  
0.75% max. C, 7.00% max. Si 16.00c. 16.40c. 16.65c.

### Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.  
Eastern Central Western  
Zone Zone Zone  
Carload, bulk... 8.35c. 8.55c. 8.95c.  
Ton lots ..... 8.75c. 9.25c. 10.75c.  
Less ton lots .. 9.00c. 9.50c. 11.00c.

### Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 65 per cent contained manganese. Add 0.25c. for spot sales.  
Eastern Central Western  
Zone Zone Zone  
Carload, bulk... 6.05c. 6.30c. 6.60c.  
Ton lots ..... 6.65c. 7.55c. 8.55c.  
Less ton lots .. 6.80c. 7.30c. 8.30c.

### Calcium-Manganese-Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.  
16-20% Ca, 14-18% Mn, 53-59% Si.  
Add 0.25c. for spot sales.  
Eastern Central Western  
Zone Zone Zone  
Carloads ..... 15.50c. 16.00c. 18.05c.  
Ton lots ..... 16.50c. 17.35c. 19.10c.  
Less ton lots.. 17.00c. 17.35c. 19.60c.

### Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.  
Cast Turnings Distilled  
Ton lots ..... \$1.80 \$2.30 \$5.00  
Less ton lots.. 1.20 2.80 5.75

### Chromium-Copper

Contract prices per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.  
Shot or Ingot ..... 45c.

### Ferroboron

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.  
Eastern Central Western  
Zone Zone Zone  
Ton lots ..... \$1.20 \$1.2075 \$1.229  
Less ton lots .. 1.30 1.3075 1.329

### Manganese-Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.  
75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.  
Eastern Central Western  
Zone Zone Zone  
Ton lots ..... \$1.89 \$1.903 \$1.935  
Less ton lots... 2.01 2.023 2.055

### Nickel-Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.  
15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.  
Eastern Central Western  
Zone Zone Zone  
11,200 lb. or more .. \$1.90 \$1.9125 \$1.9445  
Ton lots ... 2.00 2.09125 2.0445  
Less ton lots 2.10 2.1125 2.1445

### Other Ferroalloys

Ferrotungsten, Standard grade, lump or ¼X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more.... \$1.90  
Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.  
Open hearth ..... \$2.70  
Crucible ..... \$2.80  
Primos ..... \$2.90  
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal ..... \$1.50  
Vanadium pentoxide, 88-92% V<sub>2</sub>O<sub>5</sub> technical grade, contract basis, any quantity, per lb. contained V<sub>2</sub>O<sub>5</sub>. Spot sales add 5c. per lb. contained V<sub>2</sub>O<sub>5</sub> ..... \$1.10  
Silvaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)  
Carload lots ..... 25c.  
2000 lb. to carload ..... 26c.  
Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)  
Carload lots ..... 53c.  
2000 lb. to carload ..... 59c.  
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis  
No. 1 ..... \$7.5c.  
No. 6 ..... 48c.  
No. 79 ..... 45c.  
Bortram, f.o.b. Niagara Falls  
Ton lots, per lb. .... 48c.  
Less ton lots, per lb. .... 50c.  
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.  
2000 lb. lots ..... \$2.25  
Under 2000 lb. lots ..... \$2.30  
Ferrotitanium, 40-45%, 0.10% C, max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti... \$1.23  
Less ton lots ..... \$1.25  
Ferrotitanium, 30-25%, 0.10% C, max., ton lots, per lb. contained titanium ..... \$1.35  
Less ton lots ..... \$1.40  
High-carbon ferrotitanium, 15%-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload.... \$142.50  
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton ..... \$58.50  
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Sigio), Tenn., \$3 unitage freight equalized with Nashville, per gross ton ..... \$75.00  
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo. 95c.  
Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo. 80c.  
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo. .... 80c.  
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo. .... 80c.  
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add ¼c. for spot sales  
Carload lots ..... 14c.  
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy  
Carload, bulk ..... 4.6c.  
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk ..... 5.75c.  
Ton lots ..... 7.25c.  
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.  
Car lots ..... 8.00c.  
Ton lots ..... 8.75c.  
Less ton lots ..... 9.25c.